# GeoNode User Manual

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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: 3.2.0

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.

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.
Fig. 1: *GeoNode simplified architecture*
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 datasets are automatically re-projected to web Mercator for maps display, making it possible to use different popular base datasets, like Open Street Map, Google Satellite or Bing datasets.

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

1.6.4 GeoNode as a building block

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

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

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

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

RASTER DATA
- Securely stores geospatial data.

VECTOR DATA
- Specialized tools to analyze geospatial data.
- Designed to be extended and modified; it can even be integrated into existing platforms.

DATA MANAGEMENT TOOLS

METADATA
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.
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.

A live demo of the latest stable build is available at http://master.demo.geonode.org/.

![GeoNode Online Demo](image)

Fig. 2: Online Demo @ master.demo.geonode.org

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
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 20.04
- CentOS 7.0

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, datasets and documents. In order to create maps, add datasets 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 a 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.

Fig. 3: Register Link
2. On the next page, fill out the form. Enter a username and password in the fields. Also, enter your email address for verification.

![Sign up form](image)

Fig. 4: 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:

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

You have to confirm this action as described in the picture below.
Fig. 5: Alerts

Fig. 6: Logout link

Fig. 7: Confirm Log out
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 which is accessible from the user menu.

So, click on your profile picture 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. 8: Link to your profile

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

Your personal information is 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 datasets or maps or documents by clicking on the corresponding tab.

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

On the right side of the page there are many useful links to edit personal information, to upload and create datasets 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 datasets uploading and maps creation. This link is also available in the user menu.

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

Editing Profile Information

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

Through the Edit profile button of the Profile page (see Updating the Profile) you can set your details, including your avatar.

When finished, click Update profile. You will be redirected to the Profile page. A message will confirm the profile has been correctly updated.
Fig. 9: User profile page
Fig. 10: Favorites

Fig. 11: Recent activities
Edit Your Profile

Fig. 12: Updating Profile information

Profile johnsmith updated.

Fig. 13: Updating Profile correctly finalized
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.

![Accounts e-mail](image)

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 filed 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 signin, you will have to use the new password.
E-mail Addresses
The following e-mail addresses are associated with your account:

- john.smith@gmail.com Unverified Primary
- john.smith.primary@gmail.com Unverified

Make Primary | Re-send Verification | Remove

Add E-mail Address

E-mail: john.smith.primary@gmail.com

Add E-mail

Fig. 15: New e-mail association
E-mail Addresses
The following e-mail addresses are associated with your account:

- john.smith@gmail.com Unverified
- john.smith.primary@gmail.com Unverified Primary

Add E-mail Address

E-mail: E-mail address

Add E-mail

Primary e-mail address set.

Fig. 16: Primary e-mail address
Password Change

Change your password here

Current Password

...........

New Password

...........

New Password (again)

...........

Change my password

Fig. 17: Change your password

Password successfully changed.

Fig. 18: Change password confirmation
Setting Notification Preferences

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

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

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

1.10.2 Interacting with Users and Groups

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

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

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

A message will confirm that invitations have been correctly sent.

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

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

Viewing other users information

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

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

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

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

Select a user and click on its username to access to the user details page.

In this page the main information about the user are shown: personal information (organization) and the resources the user owns (datasets, maps, documents and other apps).

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

The Message User link lets you to contact other users, see the next section to read more about that.
## 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>Request resource change</td>
<td>✔</td>
</tr>
<tr>
<td>Owner has requested permissions to modify a resource</td>
<td></td>
</tr>
<tr>
<td>Dataset Created</td>
<td>✔</td>
</tr>
<tr>
<td>A Dataset was created</td>
<td></td>
</tr>
<tr>
<td>Dataset Updated</td>
<td>✔</td>
</tr>
<tr>
<td>A Dataset was updated</td>
<td></td>
</tr>
<tr>
<td>Dataset Approved</td>
<td>✔</td>
</tr>
<tr>
<td>A Dataset was approved by a Manager</td>
<td></td>
</tr>
<tr>
<td>Dataset Published</td>
<td>✔</td>
</tr>
<tr>
<td>A Dataset was published</td>
<td></td>
</tr>
<tr>
<td>Dataset Deleted</td>
<td>✔</td>
</tr>
<tr>
<td>A Dataset was deleted</td>
<td></td>
</tr>
<tr>
<td>Comment on Dataset</td>
<td>✔</td>
</tr>
<tr>
<td>A layer was commented on</td>
<td></td>
</tr>
<tr>
<td>Rating for Dataset</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>App Created</td>
<td>✔</td>
</tr>
<tr>
<td>A App was created</td>
<td></td>
</tr>
<tr>
<td>App Updated</td>
<td>✔</td>
</tr>
<tr>
<td>A App was updated</td>
<td></td>
</tr>
<tr>
<td>Notification Type</td>
<td>Description</td>
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<tr>
<td>---------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>App Approved</td>
<td>A App was approved by a Manager</td>
</tr>
<tr>
<td>App Published</td>
<td>A App was published</td>
</tr>
<tr>
<td>App Deleted</td>
<td>A App was deleted</td>
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<tr>
<td>Comment on App</td>
<td>An App was commented on</td>
</tr>
<tr>
<td>Rating for App</td>
<td>A rating was given to an App</td>
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<tr>
<td>Document Created</td>
<td>A Document was created</td>
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<tr>
<td>Document Updated</td>
<td>A Document was updated</td>
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<td>Document Approved</td>
<td>A Document was approved by a Manager</td>
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<tr>
<td>Document Published</td>
<td>A Document was published</td>
</tr>
<tr>
<td>Document Deleted</td>
<td>A Document was deleted</td>
</tr>
<tr>
<td>Comment on Document</td>
<td>A Document was commented on</td>
</tr>
<tr>
<td>Rating for Document</td>
<td>A rating was given to a document</td>
</tr>
<tr>
<td>User following you</td>
<td>Another user has started following you</td>
</tr>
<tr>
<td>User requested access</td>
<td>A new user has requested access to the site</td>
</tr>
<tr>
<td>Account activated</td>
<td>This account is now active and can log in the site</td>
</tr>
<tr>
<td>Dataset Uploaded</td>
<td>A layer was uploaded</td>
</tr>
<tr>
<td>Message received</td>
<td>New message received in one of your threads</td>
</tr>
</tbody>
</table>

Fig. 19: Notifications settings
Invite Users

Email

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

Submit

Fig. 20: *Invite users to join GeoNode*

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

Fig. 21: *Invitations confirm message*
Fig. 22: About menu - People link
Fig. 23: *List of the registered users*
1.10. GeoNode Users Guide

Fig. 24: User details

Fig. 25: User activities
It is also possible, in GeoNode, to see the recent activities of all users through the *Recent Activities* link of the user menu.

![Recent Activities link](image)

**Fig. 26: Recent Activities link**

In the picture below an example.

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

### Contacting other users

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

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

Insert your content, type a subject and click on *Send message* to send the message to the users and groups you have selected.

You will be redirected to the *Conversation* details page related to the subject.

### The Inbox page

You can view your conversations in your *Inbox* page, reachable through the *Back to inbox* button (see the picture above) or from the *Inbox* link of the user menu.

The picture below shows how your *Inbox* page should look like.

In *Inbox* all the unread messages are listed. You haven’t received any message yet so your *Inbox* is empty. If you switch to the *All* tab you can see all the conversations you are involved in.

When some user send a reply to your message your *Inbox* shows it, see the picture below for an example.
Fig. 27: Recent Activities
Fig. 28: Send message to users and groups
Greetings from John Smith

Sent to: julia254

Nov. 17, 2021, 9:52 a.m. by me

Hello, I'm John Smith, I'm now registered on Geonode!

Fig. 29: Your message

Fig. 30: Inbox link
Fig. 31: *Inbox page*

Fig. 32: *All your conversations*
Fig. 33: A reply to your message

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 integrated creation of resources eg datasets, documents, link to external documents, map visualizations and other configured geonode apps. Each resource 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. Datasets
3. Maps
Greetings from John Smith

Sent to: marthamareal@gmail.com,

Nov. 17, 2021, 9:57 a.m. by me
Hello

Nov. 17, 2021, 9:58 a.m. by marthamareal@gmail.com
Hi John, Welcome to GeoNode.

Fig. 34: Conversation details
Datasets, Documents and Remote Services can be accessed from the Data menu of the navigation bar. The Maps menu lets you filter only maps in the available resource. This applies to other existing menu items like GeoStories.

**Note:** GeoStories and Dashboards In the screenshot below are GeoApp resouces which are added by the client.

![Data menu](image)

**Fig. 35: Data menu**

**Documents**

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

Through the document detailed page is possible to view, download and manage a document.
Datasets

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

By clicking the Datasets link you will get a list of all published datasets. If logged in as an administrator, you will also see the unpublished datasets 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 datasets and their styles. Datasets can be both local datasets in GeoNode as well as remote datasets either served from other WMS servers or by web service datasets such as Google or MapQuest.

GeoNode maps also contain other information such as map zoom and extent, dataset ordering, and style.

You can create a map based on uploaded datasets, combine them with some existing datasets and a remote web service dataset, 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 datasets 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 datasets, maps and documents and other resource types by using different routes, filters and search functions. On every 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. 36: 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 and filter data by Text, Types, Categories, Keywords, Owners, 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 Most recent, Less recent, Name and Popularity.

For Users see Viewing other users information.

1.10.4 Managing Documents

In this section all the aspects concerning Documents will be discussed.
You will learn how to upload a document and how to inspect its metadata and details. All the editing tools will be also explained.
Fig. 38: Search filter by EXTENT
Fig. 39: Ordering Data
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 by clicking *Create new* which displays a list including *upload document link:*

![Document Upload link](image)

Fig. 40: Document Upload link

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 *Detail* page with a menu to save, view more info, edit metadata, share, download and delete the document. See the next section to know more about Metadata.

**Note:** If you get the following error message:

*Total upload size exceeds 100.0 MB. Please try again with smaller files.*

This means that there is an upload size limit of 100 MB. An user with administrative access can change the upload limits at the *admin panel.*
Upload Documents

Fig. 41: Document Upload page
Filling the Document Metadata

You can open the Metadata form by clicking on the Edit link in the document details menu and then Edit Metadata Link.

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.

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;
Fig. 43: *Document Basic Metadata*
• 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 Share options are listed on the right side of the page, you can edit them.

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.
Fig. 45: Document Optional Metadata
Document Information

From the Documents Search Page (see Finding Data) you can select the document you are interested in and click on its name to see an overview about it.

You can access the document details page by clicking on View document in the overview panel. 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 Document detail menu Sections

The Info link 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 link provides the document link to share.

If you want to download the document, click on the Download link in the menu and the document will be downloaded automatically.

If you want this document in your Favorites (see Updating the Profile), click the Info link and click on the start icon.
Fig. 46: Document Information page
Fig. 47: Document Sharing

Fig. 48: Document Metadata download

Fig. 49: Favorite document
Document Editing

The Document Information page makes available useful menu for document editing. Click on the Edit link then Edit Metadata to see editing forms.

Setting the Document Thumbnail

From the Metadata Form, it is possible to Set the Thumbnail of the document. Click on Choose file to open the Thumbnail Uploading page and chose the image that will illustrate your document. Once this is done, click on the ok button and save. If the thumbnail has been successfully uploaded you can see it by coming back to the document list.

Fig. 50: Upload Document’s Thumbnail

If no errors occur, the new selected thumbnail will be shown.
Editing the Document Metadata

You can edit the metadata of your document as described in the Filling the Document Metadata section or by using the Advanced Metadata option below.

The Advanced Metadata button takes you to a big form where all the available metadata of the document can be edited. Some information are mandatory such as the Title or the Category the document belongs to, some others are optional.

In the example shown in the picture above, the information inside the red rectangles have been changed. To save the changes click on Update, you will be redirected to the document page.
Fig. 52: Editing Metadata
**Share Options**

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 *Share* Link shown in the menu it is possible to manage the document share options. It opens a form where set up who can:

- View (allows to view the document).
- Download (allows to view and download the document).
- Edit (allows to change the document metadata and attributes).
- Manage it (allows to update, delete, change share options, publish/unpublish).

See an example in the picture below.

**Note:** After making changes, always save them with the *Save* Link in the menu.

Usually those with options of editing metadata and the management of a document are in charge and responsible of the document, i.e. the contributor who uploaded it has those options by default.

Once the share options are set, click *Save* link in the menu to save them.
Datasets are published resources representing raster or vector spatial data sources. Datasets can also be associated with metadata, ratings, and comments.

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

**Datasets Uploading**

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

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

The Dataset Uploading page can be reached from the Upload dataset link of the Create new menu above the resources list page.

The Datasets 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 Share options settings (see Share Options for further information on how to set share options).

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

Fig. 53: Changing the Document share options
In this example the \texttt{ne\_10m\_airports\_vufl8s3} ESRI Shapefile, with all its mandatory files (\texttt{.shp}, \texttt{.shx}, \texttt{.dbf} and \texttt{.prj}), has been chosen. A progress bar shows the operation made during the dataset upload and alerts you when the process is over. When the process ends click the dataset name in the table to check the dataset has been correctly uploaded.

\textbf{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 dataset from scratch, how to set share options, how to explore the dataset properties and how to edit them.

\textbf{Note:} If you get the following error message:

\texttt{Total upload size exceeds 100.0 MB. Please try again with smaller files.}

This means that there is an upload size limit of 100 MB. An user with administrative access can change the upload size limits at the \texttt{admin panel for size limits}.

Similarly, for the following error message:

\texttt{The number of active parallel uploads exceeds 5. Wait for the pending ones to finish.}

You can modify the upload parallelism limits at the \texttt{admin panel for parallelism limits}. 

---

Fig. 54: \textit{Link for Datasets Uploading}
Upload Datasets

![Image of datasets uploading page]

or select them one by one:

Choose Files

Files to be uploaded

ne_10m_airports_vuf1B3s3
ESRI Shapefile

- ne_30m_airports_vuf1B3s3.shx
- ne_30m_airports_vuf1B3s3.shp
- ne_30m_airports_vuf1B3s3.prj
- ne_30m_airports_vuf1B3s3.dbf

Your upload has started

Select the charset or leave default

UTF-8/Unicode

Clear

Upload files

Fig. 55: The Datasets Uploading page
Upload Datasets

Upload status

<table>
<thead>
<tr>
<th>Name</th>
<th>Created</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>ne_10m_airports_vulfl8s3</td>
<td>11/17/2021, 6:05:13 PM</td>
<td>100%</td>
</tr>
</tbody>
</table>

Permissions

Who can view it? ▼
- Anyone

The following users:
- Choose users...

The following groups:
- Choose groups...

Who can download it? ▼
Who can change metadata for it? ▼
Who can manage it? (update, delete, change permissions, publish/unpublish it)

or select them one by one:
- Choose Files

Files to be uploaded

- ne_10m_airports_vulfl8s3
- ESRI Shapefile

- ne_10m_airports_vulfl8s3.shx Remove
- ne_10m_airports_vulfl8s3.shp Remove
- ne_10m_airports_vulfl8s3.png Remove
- ne_10m_airports_vulfl8s3.dbf Remove

Performing Final GeoServer Config Step. Check the Upload status above!

Select the charset or leave default

- UTF-8/Unicode

ClearUpload files

Fig. 56: Dataset uploading finished
Creating a Dataset from scratch

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

![Create dataset link](image)

**Fig. 57: Create dataset link**

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

- **Name**
- **Title**
- **Geometry type**

![Geometry types](image)

**Fig. 58: Geometry types**

Usually the datasets 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.

At this time you can also change the default Share options settings, see Share Options to learn how.

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

Dataset name
italian_towers

Dataset title
Italian Towers

Geometry type
Points

Add Attribute
City
String
Remove Name
String
Remove Height
Float
Remove
Create

Permissions
Who can view it?
Anyone
The following users:
Choose users...
The following groups:
Choose groups..
Who can download it?
Who can change metadata for it?
Who can manage it? (update, delete, change permissions, publish/unpublish it)

Fig. 59: New Dataset creation from scratch
Using Remote Services

In GeoNode you can add new datasets 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 Add Remote Service
• type the Service URL
• select the Service Type
• click on Create

GeoNode supports four 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 datasets) and GetMap (to retrieves a map image for a specified area and content).

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

• GeoNode Web Map Service

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

<table>
<thead>
<tr>
<th>Title</th>
<th>URL</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>GeoServer Web Map Service</td>
<td><a href="https://portal.ric.gob.gt/geoserver/wms">https://portal.ric.gob.gt/geoserver/wms</a></td>
<td>Web Map Service</td>
</tr>
<tr>
<td>GeoServer Web Map Service</td>
<td><a href="https://demo.geo-solutions.it/geoserver/wms">https://demo.geo-solutions.it/geoserver/wms</a></td>
<td>Web Map Service</td>
</tr>
<tr>
<td>Mapa Base de España</td>
<td><a href="https://www.ign.es/wms-inspire/ign-base">https://www.ign.es/wms-inspire/ign-base</a></td>
<td>Web Map Service</td>
</tr>
<tr>
<td>World Imagery</td>
<td><a href="https://server.arcgisonline.com/ArcGIS/rest/services/World_Imagery/MapServer">https://server.arcgisonline.com/ArcGIS/rest/services/World_Imagery/MapServer</a></td>
<td>ArcGIS REST MapServer</td>
</tr>
<tr>
<td>USA Topo Maps</td>
<td><a href="http://services.arcgisonline.com/arcgis/rest/services/USA_Topos/MapServer">http://services.arcgisonline.com/arcgis/rest/services/USA_Topos/MapServer</a></td>
<td>ArcGIS REST MapServer</td>
</tr>
<tr>
<td>USA Topo Maps</td>
<td><a href="http://services.arcgisonline.com/arcgis/rest/services/USA_Topos/MapServer/0">http://services.arcgisonline.com/arcgis/rest/services/USA_Topos/MapServer/0</a></td>
<td>ArcGIS REST MapServer</td>
</tr>
</tbody>
</table>

**Fig. 61: Remote Services**

### Service Type

- Web Map Service
- GeoNode (Web Map Service)
- ArcGIS REST MapServer
- ArcGIS REST ImageServer

**Fig. 62: Service Types**
• **ArcGIS REST MapServer**

This map service provides basic information about the map, including the datasets 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.

• **ArcGIS REST ImageServer**

This Image Server allows you to assemble, process, analyze, and manage large collections of overlapping, multi-resolution imagery and raster data from different sensors, sources, and time periods. You can also publish dynamic image services that transform source imagery and other raster data into multiple image products on demand—without needing to preprocess the data or store intermediate results—saving time and computer resources. In addition, ArcGIS Image Server uses parallel processing across multiple machines and instances, and distributed storage to speed up large raster analysis tasks. The URL should follow this pattern: https://<servicecatalog-url>/services/<serviceName>/ImageServer.

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

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.

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 link of the Service Details page (see the picture below).

**Share Options**

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

In order to modify the Dataset Share options settings, On the detail page of the dataset click the Share link in the menu.

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

You can set the following share options:

- **View** (allows to view the dataset).
Fig. 63: *Remote Service metadata*

- **Download** (allows to view and download the dataset).
- **Edit** (allows to change the dataset metadata, change attributes and properties of the datasets features and change the dataset style).
- **Manage** (allows to update, delete, change share options, publish and unpublish the dataset).

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

Click on **Save** link in the menu to save these settings.

**Dataset Information**

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

From the resource list page, filter with datasets, click on the dataset you are interested in. The overview page will be shown on the right. Then click on **View dataset**, The dataset detail page will open.

The Dataset page has a menu which helps us to view and update dataset attributes.
Share with people and groups

https://master.demo.geonode.org/catalogue/#/dataset/330

Owner: johnsmith

Anyone
View

Registered members
None

Add Users / Groups

Filter by name or permissions

Name: admin
Permissions: Manage

Fig. 64: Change Dataset Share options
Fig. 65: Dataset Share options settings for users and groups

Fig. 66: Dataset Menu
Dataset Info

When you click the Info link in the menu, a new page will be opened on right.

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

![Dataset Info tab screenshot](image)

**Fig. 67: Dataset Infor tab**

- The Attributes tab shows the data structure behind the dataset. All the attributes are listed and for each of them some statistics (e.g. the range of values) are estimated (if possible).
- If you want this dataset in your Favorites (see Updating the Profile), You can click on star icon near the dataset name.
Fig. 68: Dataset Attributes tab

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>scalarank</td>
<td></td>
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</tr>
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<td></td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>name_it</td>
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<tr>
<td>the_geom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>type</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Downloading Datasets

At the top of the Dataset Menu there is an Export link. It provides access to the ability to extract geospatial data from within GeoNode.

You will be able to select from a list of options of the supported export file formats.

As shown in the image above, GeoNode allows you to download a subset of data. Click on Download filtered dataset to download filtered data.

On clicking Export, the file is prepared and a notification is showed when file is ready.

To download the file to your machine, click on the export dataset icon. This opens the prepared export files and you can save the files on your by clicking on the save icon on each item.

Printing

The MapStore based map viewer of GeoNode allows you to print the current view with a customizable layout. Click the Print option from the Menu, the Printing Window will open.

From this window you can:

- enter Title and Description;
- choose the Resolution in dpi;
- customize the Layout.
Fig. 70: Export Ready

Fig. 71: Export Results Icon
Fig. 72: The Printing Window
– 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 view click on Print.

Performing Measurements

Click on the Measure option of the 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.

![Figure 73: The Measure Tool](image-url)
Dataset Editing

The Edit link in the menu of the Dataset Page opens a list of options like ones shown in the picture below.

![Dataset Editing Link](image)

Fig. 74: Dataset Editing Link

In that options list, you can see three options listed as:

1. Edit Metadata
2. Edit Styles
3. Edit Data

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

Editing the Dataset Data

The Edit data link of the Dataset Editing options opens the Dataset within a Map.

The Attribute Table panel of the Dataset 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 dataset. Fill the attributes fields and click to save your change. Your new feature doesn’t have a shape yet, click on to draw its shape directly on the Map then click on to save it.

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

- **Delete Features**

  If you want to delete a feature you have to select it on the Attribute Table and click on.
Fig. 75: Editing the Dataset Data
Fig. 76: Create New Feature
• Change the Feature Shape

You can edit the shape of an existing geometry dragging its vertices with the mouse. A blue circle lets you know what vertex you are moving.

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

• Change the Feature Attributes

When you are in Edit Mode you can also edit the attributes values changing them directly in the corresponding text fields. You can achieve this by going into the edit mode and double click in the values.

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

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

Datasets Metadata

In GeoNode special importance is given to Metadata and their standard formats.

Editing Metadata

Metadata contains all the information related to the dataset. They provide essential information for its identification and its comprehension. Metadata also make the dataset more easily retrievable through search by other users.

The Metadata of a dataset can be changed through a Edit Metadata form which involves four steps, one for each type of metadata considered:

You can open the Metadata form of a Dataset by clicking the Edit Metadata link from the Edit options on the Dataset Page.

• Basic Metadata

The first two steps are mandatory (no datasets will be published if the required information are not provided) whereas the last two are optional.

In the first step the system asks you to insert the following metadata:

– The Thumbnail of the dataset (click Edit to change it);
– The Title of the dataset, which should be clear and understandable;
– An Abstract; brief narrative summary of the content of the dataset

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 dataset;
– 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 dataset belongs to;
– The Group which the dataset is linked to.
Fig. 77: Basic Dataset Metadata
Fig. 78: Location and Licenses Metadata for Datasets

- **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 dataset;
  - 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 dataset. 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 dataset 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 dataset;
Fig. 79: Optional Dataset Metadata
- The *Purpose* of the dataset and its objectives;
- Any *Supplemental information* that can provide a better understanding of the uploaded dataset;
- The *Maintenance frequency* of the dataset;
- The users who are *Responsible* for the dataset, 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**

![Metadata for roads](image)

Fig. 80: *Dataset Attributes Metadata for Dataset*

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 treat 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 dataset 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.

![Metadata for roads diagram](image)

**Fig. 81: Use a custom template**

By using the keyword `${properties.<attribute_name>}, you can tell GeoNode to render the actual value of the attribute on the map.

As an instance, the example below 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.
### Use a custom template?

<table>
<thead>
<tr>
<th>Type</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>${\text{properties.type}}$</td>
<td>${\text{properties.label}}$</td>
</tr>
</tbody>
</table>

Fig. 82: *Use a custom template: HTML*

### Use a custom template: Get Feature Info outcome

<table>
<thead>
<tr>
<th>Type</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>major</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 83: *Use a custom template: Get Feature Info outcome*
Metadata Advanced Editing

In the Edit Metadata page the Advanced Metadata button is also available.

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

Dataset 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 dataset, you should explore different styling options and choose the best style for that.

In GeoNode each dataset has one style referred to as a Default Style which is determined by the nature of the data you're mapping. When uploading a new dataset (see Datasets Uploading) a new default style will be associated to it.
Editing the Dataset Style

In order to edit a dataset style, open the Dataset Page (see Dataset Information) and click on Edit. Then click the Edit Style link in the options (see the picture below).

The Dataset will open in a new Map. The Styles Panel will show you all the default style for the dataset and some useful tools. By default, the style will be shown in a text editor form.

You could continue to change the style with the text editor or switch to a visualized editor using the Visual editor above the text editor.

The visual editor looks like this

You can then edit the style by clicking on each attribute of the style.
Creating Style Rules

In order to create a new rule, Three options are provided.

1. Mark rule
2. Icon rule
3. text rule

Click on any of the buttons below to create a type of style you want.

The rule you have chosen is now added on the top with default attributes which you can edit to your preference*. If the rule has errors, the following will be shown.

You can switch the rule ordering by dragging it to the top or bottom depending on your preference.

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.

Each rule has a delete icon on the top right which you can use to remove the rule on the style.

Click on Save on the top to save your changes.
Fig. 89: *Create new rule buttons*

Fig. 90: *New style*
Advanced Dataset Management with MapStore

GeoNode provides the user with some advanced features for dataset manipulation such as dataset filtering, attribute edition and dataset export in different formats. In a nutshell, these feature are provided via MapStore and we will redirect the user to MapStore specific documentation for further details.

Filtering Datasets

With GeoNode you can filter a dataset via it’s attributes, direct map filter by drawing an area of interest over the map canvas and via cross-dataset filter, allowing intersection, contained and contains overlay methods. For more detail please check the MapStore documentation here.
**Attribute Table**

GeoNode provides tools for attribute manipulation that allows the edition and creation of new attributes with simplicity. Such set of tools provided by MapStore also allows the user to filter, search, zoom features from a table of attributes perspective like in a common GIS Desktop environment. For more detail please check the MapStore documentation here.

**Styling Advanced**

MapStore allows for advance styling features not covered fully on previous GeoNode section. If you wish to deep your knowledge on these capabilities, please follow this documentation link.
1.10.6 Managing Maps

Maps are sets of datasets 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 datasets, combine them with some other datasets 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 listed after clicking the Create new link on the menu above the resources list page.

![Create Map link](image)

**Fig. 92: The Create Map link**

- The Create map link in the Dataset Page (it creates a map using a specific dataset)

![Create map from dataset](image)

**Fig. 93: The Create map link from dataset**

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

In the upper left corner the [toc_button] button opens the Table of Contents (TOC) of the Map. It allows to manage all the datasets associated with the map and to add new ones from the Catalog.

The TOC component makes possible to manage datasets overlap on the map by shifting their relative positions in the list (drag and drop them up or down in the list).
Fig. 94: *The Map Viewer*
It also allows to hide/show datasets ([show_button] and [hide_button]), to zoom to datasets extents ([zoom_to_dataset_extent_button]) and to manage their properties ([dataset_settings_button]).

Once the map datasets have been settled it is possible to save the Map by clicking on [burger_menu_button] 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 Finding Data section, in GeoNode you can see your maps and all the published maps through the filtering feature on the resource page.

Click on the title of the Map you are interested in to open its overview, then click on View Map, it should looks like the following.

![Map Detail page](image)

Fig. 95: Map Detail page

The Map Detail Page shows the Map with very basic functionalities:

- the Base Map Switcher that allows you to change the base map;
- the Zoom in/out tool to enlarge and decrease the view;
• the *Zoom to max extent* tool for the zoom to fit the datasets extents;

• the *Query Objects* tool to retrieve information about the map objects by clicking on the map;

• the *Print* tool to print the preview.

To see the information of the Map, click on the `guilabel: Info` in the menu of the details page. This 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. see example below.

![Map Information page](image)

**Fig. 96: Map Information page**

See the MapStore Documentation to learn more.

**Map Sharing**

• The *Share link* on the detail page provides the link for the map to share.
Maps Metadata

Maps Metadata can be Edited by clicking the Edit Metadata link from the Map Detail page.

The Map Metadata Edit form will open. 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 three-steps 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;
Fig. 99: Basic Map Metadata
– 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

![Metadata for New Test Map](image)

Fig. 100: Location and Licenses Metadata for Maps

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

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

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

• Optional Metadata

Complementary information are:
Fig. 101: Optional Map Metadata
-- 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.

Fig. 102: Completeness Progress Bar

Metadata Advanced Editing

The Advanced Metadata editing button in the Metadata Edit form allows to change the map metadata.

Fig. 103: The Advanced Edit button

Click on it to display the Metadata Advanced Editing Page. That page allows you to edit all the map metadata described in the previous paragraph.

Once you have finished to edit them click on Update to save your changes.
Share Options

In GeoNode the share options 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, and anyone can view them.

In order to modify the Map Share Options settings you can click the Share link in the Map Detail Page.

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

Fig. 104: Map Share options settings for users and groups

You can set the following options:

- **View** (allows to view the map).
- **Download** (allows to view and download the map).
- **Edit** (allows to change the map’s metadata);
- **Manage** allows to update, delete, change share options, publish and unpublish the map.

**Warning:** When assigning options to a group, all the group members will have that option. Be careful in case of editing them.

Click on Save link in the menu to save these settings.
Exploring Maps

In this section, we are going to explore all tools provided on the Map View page. From the list of available maps, you can select the map you are interested in and click View map, The map vie will look like this.

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 Other Menu Tools which contains the link to the Print tool, to the datasets 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).

Fig. 105: The Map View
Table of Contents (TOC)

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

Fig. 106: The Table Of Contents (TOC)

From the TOC you can:

- manage the datasets Overlap;
- filter the datasets list by typing text in the Filter Datasets field;
- add new datasets from the Catalog by clicking the Add Dataset button;
- manage the datasets properties such as Opacity (scroll the opacity cursor), Visibility (click on [hide_button] to make the dataset not visible, click on [show_button] to show it on map);
- manage the Dataset Settings, see the next paragraph.

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

The Toolbar shows you many buttons:

- [zoom_to_dataset_extent_button] allows you to zoom to the dataset extent;
- [dataset_settings_button] drives you through the dataset settings customization (see the next paragraph);
- [attribute_table_button] to explore the features of the dataset and their attributes (more information at Attributes Table);
- [delete_dataset_button] to delete datasets (click on Delete Dataset to confirm your choice);
Fig. 107: Scrolling the Dataset Opacity

Fig. 108: The Dataset Toolbar
Managing Dataset Settings

The Dataset Settings panel looks like the one below.

The Dataset 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 dataset Title, insert a Description and change/create the Dataset Group.

Click on the Display tab to see what are the dataset 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 dataset 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 Dataset Styling section to read more.
Fig. 110: The Dataset Settings Panel
Fig. 111: *The Dataset 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 dataset, 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 dataset 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 Dataset Data section for further information.

- **Advanced Search**
Fig. 113: *Filtering Features by Attribute*

Fig. 114: *The Attributes Table Toolbar*
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.

- **Export Data**
  
  Click on to open the export/download data form.

- **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.

- **Create a chart**
  
  Through the button you can open the Chart Widgets panel where many functionalities to describe and visualize the dataset 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 dataset 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 dataset. 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 the search.

  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 **Area 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 **Dataset Filter** you can select only those features which comply with some conditions on other datasets of the map. You can also add conditions on attributes for those datasets.

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

Match any of the following conditions:

**Area of interest**

Filter type: Select...

Geometric operation: Intersects

**Layer filter**

Target layer: Select layer

---

Fig. 115: Advanced Search
**Attribute filter**

Match all of the following conditions:

- `fid` = 1
- `featurecla` = Airport
- `scalerank` = 37

**Area of interest**

Filter type: Select...

Geometric operation: Intersects

**Layer filter**

Target layer: Select layer

Fig. 116: Filtering by Attributes
Fig. 117: Filtering by Area Of Interest

Fig. 118: Dataset Filtering
Creating Widgets

Widgets are graphical elements that describe the datasets 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.

![Widget Selection]

**Chart**

*add a chart*

**Text**

*add a text area*

**Table**

*add a table*

**Counter**

*add a counter*

Fig. 119: *Creating Widgets*

Chart Widgets

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

Lets create a new Bar Chart.

Click on Bar Chart then select the X Attribute, the Y Attribute, the Operation and the Color do you prefer. You can also display the Legend, Hide the Y axis, Hide the grid and decide what Label display into the legend.

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

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

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

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

Fig. 120: *Chart Widgets*
The green icon means that the chart is connected to the viewport.

At the top of the bar chart, there is the options menu of the widget where you can Download graph as png, Zoom the widgets and Reset axes.

**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.

**Table Widgets**

Through the Table Widgets you can add the Attributes Table of the dataset 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 datasets with a time dimension. Those vector datasets 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 datasets’ evolution over time, to inspect the dataset configuration at a specific time instant and to view different dataset 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 dataset 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.
Fig. 121: Chart Widgets Creation
Fig. 122: Chart Widgets Options

Fig. 123: Text Widgets Creation
Fig. 124: My Text Widget

Configure table options
Columns

- fid
- scalerank
- featurecla
- type
- name
- abbrev
- location
- gps_code
- iata_code

Fig. 125: Table Widgets Columns
**Fig. 126: Table Widget**

**Configure data**

42

Use: 

Select attribute

Operation: 

Select attribute

Unit of measure:

**Fig. 127: Counter Widget Creation**
Fig. 128: Counter Widget

Fig. 129: The Timeline

Fig. 130: The Time Control Buttons
On the other side there are the buttons responsible for managing the animations. In particular you can Play the animation by clicking |play_button|, go back to the previous time instant through |time_go_backward_button|, go forward to next time step using |time_go_forward_button| and stop the animation by clicking |stop_button|.

![Fig. 131: The Animation Control Buttons](image)

The Timeline panel can be expanded through the |expand_timeline_button| button.

![Fig. 132: The Expanded Timeline](image)

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

- the distribution of the data over time

![Fig. 133: The Timeline Histogram](image)

- the Time Cursor

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

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

The Timeline allows you to see the data configurations (one for each time in which the data are defined) through ordered sequences of steps. As said before, you can play the resulting Animation by clicking the play button [play_button]. The dataset data displayed on map will change accordingly to the time reach by the cursor on the Histogram.

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

You can activate the Snap to guide dataset so that the time cursor will snap to the selected dataset’s data. You can also set up the Frame Duration (by default 5 seconds).
If the Snap to guide dataset option is disabled, you can force the animation step to be a fixed value.

The Animation Range option lets you to define a temporal range within which the time cursor can move.
See the MapStore Documentation for more information.
**Timeline Settings**

Snap to guide layer

**Playback Settings**

Frame Duration

5

Animation Step

1 Day

Animation Range

Follow the animation

Fig. 136: *The Timeline Settings*
Fig. 137: The *Timeline Animation Range*
Other Menu Tools

At the top of the Map there are more menu items which we are going to explain in this section.

Fig. 138: *The Map Options Menu*

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 Menu, the **Printing Window** will open.

Fig. 139: *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 Datasets Catalog

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

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

Performing Measurements

Click on the Measure option of the 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).

Saving a map

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

Click Save again under the Save options.

You could create a new map from the existing view by clicking Save As... | A new popup window will open.

The current map title is filled by default. You can change it to the prefered naming then click on Save. The page will reload and your map should be visible in the Finding Data list.
Fig. 140: *The Datasets Catalog*

Fig. 141: *The Measure Tool*
Fig. 142: Measuring Areas

Fig. 143: Saving Maps
Customizing The Datasets’ GetFeatureInfo Templates

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

![Fig. 1](image)

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.

Currently, GeoNode allows a very simple mechanism to customize the “GetFeatureInfo Template” of a dataset. It is possible, through the dataset Metadata Editor, to assign a name, a label and also set the attributes we want to display on the GetFeatureInfo output.

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

The “GetFeatureInfo” output will change accordingly as shown in Fig. 3
Metadata for ne_10m_airports_vufl8s31

Fig. 145: Fig. 2

Fig. 146: 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 Edit attributes panel.

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

![Metadata for ne_10m_airports_vufl8s31](image)

Fig. 147: Fig. 4

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.

![Metadata for ne_10m_airports_vufl8s31](image)

Fig. 148: Fig. 5

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
Fig. 149: Fig. 6

Fig. 150: Fig. 7

Fig. 151: Fig. 8
Advanced Template: Use A Custom HTML Template

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

![Use a custom template?](image)

Fig. 152: *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}`

![Use a custom template?](image)

Fig. 153: *Fig. 10*
Fig. 154: Fig. 11

Fig. 155: Fig. 12
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.

![Search Bar](image)

Fig. 156: The Search Bar

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.
Fig. 157: Result of a Search
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 \( \text{Zoom In} \) and \( \text{Zoom Out} \). Other options can be explored by clicking on \( \ldots \) which expands/collapses the toolbar.

![Fig. 158: The Default Sidebar](image)

The Sidebar contains the following tools:

- The Query Objects on map allows you to get feature information through the button. It allows you to retrieve information about the features of some datasets 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 dataset.

- You can Zoom To Max Extent by clicking \( \text{Zoom To Max Extent} \).
Fig. 159: The Expanded Sidebar
Fig. 160: Querying Objects on map
**Basemap Switcher**

By default, GeoNode allows to enrich maps with many world backgrounds. You can open available backgrounds by clicking on the map tile below:

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

![The Basemap Switcher Tool](image)

**Fig. 161: The Basemap Switcher Tool**

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

**Footer Tools**

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

The button allows you to see the pointer *Coordinates* and to change the Coordinates Reference System (CRS), WGS 84 by default.
Fig. 162: *Switching the Basemap*
Fig. 163: *The Map Scale*

Fig. 164: *The Pointer Coordinates and the CRS*
### 1.10.7 Publishing Data

In GeoNode, each resource can be published in order to share it with other people.

In order to publish a map, document or dataset or any other GeoNode resource, go to the settings tab in the Metadata Edit form. The check for publishing and unpublishing is available. See picture below.

![Resource publishing](image)

Click :guilabel:`Update` to save the changes.

### 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).
Fig. 166: 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. 167: 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. 168: Details of Geonode instance Dialog
Fig. 169: Successful connection Dialog

Fig. 170: Geonode instance layers Dialog
Fig. 171: 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: Jrch2oPY3akmzndmgUTYrs9gc
Client secret: **************
Client type: Confidential
Authorization grant type: Authorization code
Redirect uris: 
http://localhost:8080/geoserver/index.html
http://localhost/geoserver/index.html
http://127.0.0.1:7070/qgis-client
Algorithm: RSA with SHA-2 256

Save
1.10. GeoNode Users Guide
• 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.
1.10. GeoNode Users Guide
<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>This is a description of</td>
<td>your Web MapServer.</td>
</tr>
<tr>
<td>1</td>
<td>geonode:ACQU...</td>
<td>acquie_interne...</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>geonode:Abruzzo...</td>
<td>ctr_aquila</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>geonode:CP.Cs...</td>
<td>Particelle</td>
<td>Il layer contiene le particelle catastali.</td>
</tr>
<tr>
<td>7</td>
<td>geonode:CP.Cs...</td>
<td>Mappe</td>
<td>Il layer contiene la rappresentazione.</td>
</tr>
<tr>
<td>9</td>
<td>geonode:RC015...</td>
<td>Prateria</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:stade</td>
<td>Strade</td>
<td>Il layer contiene la rappresentazione.</td>
</tr>
<tr>
<td>26</td>
<td>geonode:geophf...</td>
<td>Dataset Test</td>
<td>Lorem ipsum dolor sit amet, consec...</td>
</tr>
</tbody>
</table>
GeoStory

GeoStory is a MapStore tool integrated in GeoNode that provides the user a way to create inspiring and immersive stories by combining text, interactive maps, and other multimedia content like images and video or other third party contents. Through this tool you can simply tell your stories on the web and then publish and share them with different groups of GeoNode users or make them public to everyone around the world.

To build a new GeoStory go to Create new option on the resource page and choose option Create geostory.

![Fig. 172: New GeoStory Apps option](image)

Now you landed on the GeoStory edition page that is composed of the following sections:

![Fig. 173: New GeoStory Apps option](image)

The GeoStory content is organized in Sections, that can be added with the button in the Container area. In particular, the user can add to the story the following kind of sections:
For more information on these specific section please follow the official MapStore documentation:

- Title Section
- Banner Section
- Paragraph Section
- Immersive Section
- Media Section
- Web Page Section

**Add GeoNode content to GeoStory**

With GeoNode you can add content to your GeoStory using internal GeoNode documents and maps as well external sources. This ability to add internal GeoNode content makes the GeoStory creation a very useful feature.

To add GeoNode content to your GeoStory use the button on top of your GeoStory section.

From here you can add *Images, Videos and Maps*. To enable GeoNode internal catalog, on *Services* dropdown choose *GeoNode* as shown in picture down. On the left you get a list of media documents available with a complementary text filter feature on top.

To save your GeoStory, on the top your Geostory content choose *Save* and then *Save as*…

Now your GeoStory can be shared with everyone!
Fig. 175: Add Media to GeoStory

Further Reading

Follow the link below to get more detailed information about the usage of GeoStory.

GeoStory Documentation

Dashboard

Dashboard is a MapStore tool integrated in GeoNode that provides the user with a space to add many Widgets, such as charts, maps, tables, texts and counters, and can create connections between them in order to:

- Provide an overview to better visualize a specific data context
- Interact spatially and analytically with the data by creating connections between widgets
- Perform analysis on involved data/layers

To build a new Dashboard go to Create new option on the resource page and choose option Create dashboard.

Now you landed on the Dashboard edition page that is composed of the following sections:

Further Reading

Follow the link below to get more detailed information about the usage of Dashboard.

Dashboard Documentation
Fig. 176: *New Dashboard Apps option*

Fig. 177: *New Dashboard Apps option*
1.10.9 Dynamic Extra Metadata

In GeoNode it is possible to add metadata to each resource dynamically without extending the base model provided by the application using the extra metadata field.

Settings

Three main settings control the extra metadata field:

**DEFAULT_EXTRA_METADATA_SCHEMA**: define the schema used to store the metadata

- *id*: (optional int): the identifier of the metadata. Optional for creation, required in the Upgrade phase
- *filter_header*: (required object): Can be any type, is used to generate the facet filter header. Is also an identifier.
- *field_name*: (required object): name of the metadata field
- *field_label*: (required object): a verbose string of the name. Is used as a label in the facet filters.
- *field_value*: (required object): metadata values

An example of metadata that can be ingested is the following:

```
[
    {
        "filter_header": "Bike Brand",
        "field_name": "name",
        "field_label": "Bike Name",
        "field_value": "KTM",
    },
    {
        "filter_header": "Bike Brand",
        "field_name": "name",
        "field_label": "Bike Name",
        "field_value": "Bianchi",
    }
]
```

The above schema is valid by using the `schema <https://github.com/keleshev/schema>`

**CUSTOM_METADATA_SCHEMA**: environment variable used to inject additional schema to the default one. Helpful for third-party libraries

**EXTRA_METADATA_SCHEMA**: used to get the expected metadata schema for each resource_type.

Metadata manipulation

There are two possible ways to manipulate extra metadata in geonode:

- via Metadata Editor (Wizard and advanced)
- via Rest API
Metadata Editor (wizard/advanced):

The metadata section is placed under the OPTIONAL METADATA section available for all the GeoNode resources. The metadata must follow two specific rules to save to the resource:

- Must always be a list of JSON. This permits to add of more than one metadata for each resource
- The JSON must follow the schema defined in the `settings.py` for the selected resource.

For example, for my document resource, I can have something like the following:

```json
[  
  
  {  
      "field_name": "bike",  
      "field_label": "KTM",  
      "field_value": "ktm",  
      "filter_header": "Sports Parameters"
  }
]
```

![Extra metadata](image)

Fig. 178: Advanced edit wizard menu

After pressing the save button, the system will perform the following checks:

- Check if the text provided is a valid JSON. In case of wrong format input, the following error is shown:
- Check if the metadata schema is provided for the resource if not will raise the following error
- Check if the metadata schema is coherent with the schema defined in the settings. In case of wrong format input, the error will print the missing JSON keys
• 0: extra_metadata: The value provided for the Extra metadata field is not a valid JSON

---

Fig. 179: invalid JSON error

---

• 0: extra_metadata: EXTRA_METADATA_SCHEMA validation schema is not available for resource dashboard

---

Fig. 180: missing schema error
Facet Filtering

Automatically the web interface will create dynamically the facets if there is at least 1 metadata defined for the resource. Suppose that a resource have the following metadata:

```
[{
  "field_name": "bike",
  "field_label": "KTM",
  "field_value": "ktm",
  "filter_header": "Sports Parameters"
},
{
  "field_name": "mountain",
  "field_label": "Monte bianco",
  "field_value": "monte_bianco",
  "filter_header": "Italian Mountains"
}]
```

By default GeoNode will convert this metadata info in facets available for the resource.

The facet will convert: - `filter_header`: used as the header filter - `field_value`: used to perform the search - `field_name`: used for calculate the unique values (along with `field_value`)

After says that, the facet will be the follow:
Rest API

The api/v2/resources endpoint provides different ways to handle the metadata.

GET:
Get the metadata list of the selected resource

URL: http://host/api/v2/resources/{resource_id}/extra_metadata

Response:

```
{
    "id": 1,
    "field_name": "bike",
    "field_label": "KTM",
    "field_value": "ktm",
    "filter_header": "Sports Parameters"
}
```

POST:
Adding new metadata to the resource

URL: http://host/api/v2/resources/{resource_id}/extra_metadata

Data:
```
data = [
    {
        "field_name": "bike",
        "field_label": "KTM",
        "field_value": "ktm",
        "filter_header": "Sports Parameters"
    }
]
```

Response:
```
status_code: 201
response json: List of the available metadata for the resource
```

(continues on next page)
```
"field_name": "bike",
"field_label": "KTM",
"field_value": "ktm",
"filter_header": "Sports Parameters"
```

**PUT:**

Update specific metadata for the selected resource. In this case the metadata ID is required to perform the update.

```plaintext
http://host/api/v2/resources/{resource_id}/extra_metadata
```  
**payload:**

```json
[
{
   "id": 1,
   "field_name": "bike",
   "field_label": "KTM - sport", <- this value need to be updated
   "field_value": "ktm",
   "filter_header": "Sports Parameters"
}
]
```

**Response:**

status code: 200  
response: the available payload *for* the selected resource

```json
[
{
   "id": 1,
   "field_name": "bike",
   "field_label": "KTM - sport",
   "field_value": "ktm",
   "filter_header": "Sports Parameters"
}
]
```

**DELETE:**

Delete the metadata for a given resource by ID.

```plaintext
http://host/api/v2/resources/{resource_id}/extra_metadata
```  
**payload:** list of ID to be deleted

```json
[
   1, 2, 3, 4, 5
]
```

**Response:**

status code: 200  
response: List of the available metadata

```json
[]
```
API search

Is possible to search for resources with specific metadata. This feature is available for both API v1 and API v2

APIv1:
To perform the search is enough to add as query parameters the field of the metadata payload.
Assuming that the payload is the same as the example above, the URL could be something like the following:
http://host/api/base/?metadata__field_category=bike
In this way, we can retrieve all the resources that have at least 1 metadata with the `field_category = 'bike'`

APIv2

For the API v2 is a bit different since the library doesn’t have a support for the JSON field.
To reproduce the same search above, we need to call a URL like the following one:
http://localhost:8000/api/v2/resources?filter{metadata.metadata.icontains}=%22field_category%22:%20%22bike%22
In this way, we can retrieve all the resources that have at least 1 metadata with the `field_category = 'bike'`

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. **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 (20.04)

---

**Note**: Recommended version 20.04 (Focal Fossa).
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 python3-gdal=3.3.2+dfsg-2~focal2 gdal-bin=3.3.2+dfsg-2~focal2
    libgdal-dev=3.3.2+dfsg-2~focal2
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 libpq-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
```

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
dsuo autoremove --purge

sudo usermod -aG docker ${USER}
su ${USER}
```

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:

```
sudo yum -y install epel-release
sudo yum install -y python3-gdal=3.3.2+dfsg-2~focal2 gdal-bin=3.3.2+dfsg-2~focal2
    -libgdal-dev=3.3.2+dfsg-2~focal2
sudo yum install -y python3-pip python3-dev python3-virtualenv python3-venv
    -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
sudo yum install -y git unzip gcc zlib1g-dev libgeos-dev libproj-dev
```

Docker Setup (First time only)

```
sudo yum install -y yum-utils device-mapper-persistent-data lvm2
    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-
    $(uname -s)-$(uname -m)" -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 3.2.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==3.2

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

(continues on next page)
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:

<some date> [UWSGI] Uwsgi running...

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

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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:

```bash
--- 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
-GEONODE_DATABASE={{project_name}}
+GEONODE_DATABASE=my_geonode
GEONODE_DATABASE_PASSWORD=geonode
-GEONODE_GEODATABASE={{project_name}}_data
+GEONODE_GEODATABASE=my_geonode_data
GEONODE_GEODATABASE_PASSWORD=geonode

-DATABASE_URL=postgresql://{{project_name}}:geonode@db:5432/{{project_name}}
-GEODATABASE_URL=postgresql://{{project_name}}_data:geonode@db:5432/{{project_name}}_data
+DATABASE_URL=postgresql://my_geonode:geonode@db:5432/my_geonode
+GEODATABASE_URL=postgresql://my_geonode_data:geonode@db:5432/my_geonode_data
DEFALT_BACKEND_DATASTORE=datastore
BROKER_URL=amqp://guest:guest@rabbitmq:5672/
```

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

# 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

MOSAIC_ENABLED=False

# nginx

# HTTPD Server

-GEONODE_LB_HOST_IP=localhost

+GEONODE_LB_HOST_IP=my_geonode.geonode.org

GEONODE_LB_PORT=80

HTTP_HOST=localhost
HTTPS_HOST=

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 if you want to use HTTP only)
# 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
# LETSENCRYPT_MODE=staging
-# LETSENCRYPT_MODE=production
+LETSENCRYPT_MODE=production

RESOLVER=127.0.0.11

(continues on next page)
# 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_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.

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

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

2. Install an editor if not present

   ```
   apk add nano
   ```

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

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

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

```bash
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;
    ssl_certificate_key /certificate_symlink/privkey.pem;
    ssl_protocols TLSv1 TLSv1.1 TLSv1.2;
}
```

(continues on next page)
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 through 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
```

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 Welcome Page](image)

**OAUth2 REST API Key**

**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.
Fig. 182: GeoServer Admin Password Update
Fig. 183: OAuth2 REST API Key Update
GeoServer Disk Quota

![GeoServer Disk Quota](image)

Fig. 184: GeoServer Disk Quota Update

Update the passwords and keys on `.env` file

**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

```bash
--- my_geonode\.env
+++ my_geonode\prod.env
```

(continues on next page)
@@ -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 @@
# #################
# 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
+GEOSERVER_ADMIN_USER=admin
+GEOSERVER_ADMIN_PASSWORD=<new_geoserver_admin_password>

OGC_REQUEST_TIMEOUT=30
OGC_REQUEST_MAX_RETRIES=1
OGC_REQUEST_BACKOFF_FACTOR=0.3
OGC_REQUEST_POOL_MAXSIZE=10
OGC_REQUEST_POOL_CONNECTIONS=10
@@ -84,13 +85,13 @@
RESOLVER=127.0.0.11

# Security
# #################
# Admin Settings
-ADMIN_PASSWORD=admin
+ADMIN_PASSWORD=<new_geonode_admin_password>
 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
@@ -114,15 +115,15 @@
ACCOUNT_CONFIRM_EMAIL_ON_GET=False
ACCOUNT_EMAIL_VERIFICATION=optional
ACCOUNT_EMAIL_CONFIRMATION_EMAIL=False
ACCOUNT_EMAIL_CONFIRMATION_REQUIRED=False

(continues on next page)
# OAuth2
-OAUTH2_API_KEY=
-OAUTH2_CLIENT_ID=3rchz2oPY3akmzndmgUTYrs9gczlgoV20YPsvaV
-OAUTH2_CLIENT_SECRET=rCnp5txoBuoB83EeQEBI4f5Q3VjT5zb5qRfxnSuvPzCqZaiRyT0xM4jdgMiZKFfEPBYXzCld7B8NkcfDBY9HKelIPcYs5Cp08KV
+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=

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

Warning: Be careful! The env GEOSERVER_ADMIN_PASSWORD is not actually used to change the GeoServer admin password. You need to login on GeoServer UI and change it manually!

[Optional] Update your SSL 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'
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:+UseConcMarkSweepGC
-XX:+UseParNewGC -XX:ParallelGCThreads=4 -Dfile.encoding=UTF8 -Djavax.servlet.
request.encoding=UTF-8
-Djavax.servlet.response.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 `GEOSERVER_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

![GeoServer Status](image.png)

**Fig. 185: GeoServer Status**

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

- 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](https://docs.geoserver.org/stable/en/user/configuration/image_processing/index.html#image-processing)

- 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.
  - **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**: *Raster Rendering Options* allows you to tune up the WMS output for better performance or quality. Best Performance: *Nearest Neighbour* - Best Quality: *Bicubic*
Fig. 186: Global Settings

Fig. 187: Image Processing Settings

Fig. 188: WCS Resource Consumption Limits
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:

**Raster Rendering Options**

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

**Resource consumption limits**

- Max rendering memory (KB)
  - 65536
- Max rendering time (s)
  - 60
- Max rendering errors (count)
  - 1000
- Max number of dimension values
  - 100
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.

---

![Tile Caching: Tiled Datasets](image)

**Fig. 192:** *Tile Caching: Tiled Datasets*

- 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
```

(continues on next page)
# 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

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

### # Update the GeoServer WEB-INF/lib JARs accordingly

```
wget --no-check-certificate "https://repo1.maven.org/maven2/org/postgis/postgis-jdbc/1.3.3/postgis-jdbc-1.3.3.jar" -O postgis-jdbc-1.3.3.jar && \\
wget --no-check-certificate "https://maven.geo-solutions.it/org/hibernatespatial/hibernate-spatial-postgis/1.1.3.2/hibernate-spatial-postgis-1.1.3.2.jar" -O hibernate-spatial-postgis-1.1.3.2.jar && \\
rm /usr/local/tomcat/webapps/geoserver/WEB-INF/lib/hibernate-spatial-h2-geodb-1.1.3.1.jar && \\
mv hibernate-spatial-postgis-1.1.3.2.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.

```bash
# 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 Datasets Permissions* in order to regenerate the security rules.

**Fixup GeoNode Datasets 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. 194: GeoFence Data Rules**

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

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

# Run the `sync_geonode_datasets` management command
./manage.sh sync_geonode_datasets --updatepermissions
```
Regenerate GeoNode Datasets Thumbnails

The following procedure allows you to batch regenerate all Datasets Thumbnails:

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

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

Regenerate GeoNode Datasets BBOXES

The following procedure allows you to batch regenerate all Datasets BBOXES:

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

# Run the `sync_geonode_datasets` management command
./manage.sh sync_geonode_datasets --updatebbox
```

Fixup GeoNode Datasets 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 `set_all_layers_metadata` management command
./manage.sh set_all_layers_metadata -d
```

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

(continues on next page)
# 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
```

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 --allow-downgrades build-essential
   python3-gdal=3.3.2+dfsg-2~focal2 gdal-bin=3.3.2+dfsg-2~focal2 libgdal-dev=3.3.2+dfsg-2~focal2
   python3.8-dev python3.8-venv virtualenvwrapper
   libxml2 libxml2-dev gettext libmemcached-dev zlib1g-dev
   libxslt1-dev libjpeg-dev libpng-dev libpq-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

# If the update-alternatives command does not work, try below command and select the_
# number coinciding with openjdk-8-jdk
sudo update-alternatives --config java

# Verify GDAL version
gdalinfo --version
   $> GDAL 3.3.2, released 2021/09/01

# Verify Python version
python3.8 --version
   $> Python 3.8.10

which python3.8
   $> /usr/bin/python3.8

# Verify Java version
java --version
   $> openjdk version "1.8.0_315"

# Install VIM
```
(continues on next page)
sudo apt install -y vim

# Cleanup the packages
sudo apt update -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.

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

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

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

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

`# Create the GeoNode Virtual Environment (first time only)`

`export WORKON_HOME=~/.virtualenvs`

`sourc~/usr/share/virtualenvwrapper/virtualenvwrapper.sh`

`mkvirtualenv --python=/usr/bin/python3.8 geonode # Use the python path from above`

`# Alternatvely you can also create the virtual env like below`

`mkdir -p ~/.virtualenvs`

`python3.8 -m venv ~/.virtualenvs/geonode`

`sourc~/.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

`sourc~/usr/share/virtualenvwrapper/virtualenvwrapper.sh geonode`

`workon geonode`

`# Alternatvely you can also create the virtual env like below`

`sourc~/.virtualenvs/geonode/bin/activate`

**Note:** In order to save permanently the virtualenvwrapper environment

`vim ~/.bashrc`

(continues on next page)
# 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 3.2.x geonode

# Install the Python packages
pip install -r requirements.txt --upgrade --no-cache --no-cache-dir
pip install -e . --upgrade
pip install pygdal="\gdal-config --version\""

3. Postgis database Setup

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\main" >> /etc/apt/sources.list.d/pgdg.list'
sudo wget --no-check-certificate --quiet -O - https://www.postgresql.org/media/keys/\ACC4CF8.asc | sudo apt-key add -
sudo apt update -y; sudo apt install -y postgresql-13 postgresql-13-postgis-3 postgresql-13-postgis-3-scripts postgresql-13 postgresql-client-13

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

```
sudo service postgresql start
sudo -u postgres createuser -P geonode
# Use the password: geonode
```

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

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

Create database **geonode** and **geonode_data** with owner **geonode**

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

Next let’s create PostGIS extensions

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

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

```
sudo vim /etc/postgresql/13/main/pg_hba.conf
```

Scroll down to the bottom of the document. We want to make local connections 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
```

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<table>
<thead>
<tr>
<th>TYPE</th>
<th>DATABASE</th>
<th>USER</th>
<th>ADDRESS</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>local</td>
<td>all</td>
<td>postgres</td>
<td>trust</td>
<td></td>
</tr>
</tbody>
</table>

# "local" is for Unix domain socket connections only

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DATABASE</th>
<th>USER</th>
<th>ADDRESS</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>local</td>
<td>all</td>
<td>all</td>
<td></td>
<td>md5</td>
</tr>
</tbody>
</table>

# IPv4 local connections:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DATABASE</th>
<th>USER</th>
<th>ADDRESS</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>host</td>
<td>all</td>
<td>all</td>
<td>127.0.0.1/32</td>
<td>md5</td>
</tr>
</tbody>
</table>

# IPv6 local connections:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DATABASE</th>
<th>USER</th>
<th>ADDRESS</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>host</td>
<td>all</td>
<td>all</td>
<td>::1/128</td>
<td>md5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DATABASE</th>
<th>USER</th>
<th>ADDRESS</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>local</td>
<td>replication</td>
<td>all</td>
<td></td>
<td>peer</td>
</tr>
<tr>
<td>host</td>
<td>replication</td>
<td>all</td>
<td>127.0.0.1/32</td>
<td>md5</td>
</tr>
<tr>
<td>host</td>
<td>replication</td>
<td>all</td>
<td>::1/128</td>
<td>md5</td>
</tr>
</tbody>
</table>

Warning: If your PostgreSQL database resides on a separate/remote machine, you’ll have to allow remote access to the databases in the `/etc/postgresql/13/main/pg_hba.conf` to the geonode user and tell PostgreSQL to accept non-local connections in your `/etc/postgresql/13/main/postgresql.conf` file.

Restart PostgreSQL to make the change effective.

```
sudo service postgresql restart
```

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

```
psql -U 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
```

4. Install GeoServer

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:

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

**Warning:** Now, go to the official Apache Tomcat website and download the most recent version of the software to your server. But don’t use Tomcat10 because there are still some errors between Geoserver and Tomcat.

```bash
VERSION=9.0.56; 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:

```bash
sudo mkdir /opt/tomcat
sudo tar -xf apache-tomcat-$VERSION.tar.gz -C /opt/tomcat/; rm apache-tomcat-$VERSION.tar.gz
```

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

```bash
sudo ln -s /opt/tomcat/apache-tomcat-$VERSION /opt/tomcat/latest
```

Now, let’s change the ownership of all Apache Tomcat files as below:

```bash
sudo chown -R tomcat:www-data /opt/tomcat/
```

Make the shell scripts inside the `bin` directory executable:

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

Create the a systemd file with the following content:

```bash
# 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/

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

(continues on next page)
# Let's create the tomcat service

```shell
sudo vim /etc/systemd/system/tomcat9.service
```

```ini
[Unit]
Description=Tomcat 9 servlet container
After=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 -Djava.awt.headless=true"
Environment="CATALINA_BASE=/opt/tomcat/latest"
Environment="CATALINA_HOME=/opt/tomcat/latest"
Environment="CATALINA_PID=/opt/tomcat/latest/temp/tomcat.pid"
Environment="CATALINA_OPTS=-Xms512M -Xmx1024M -server -XX:+UseParallelGC"
ExecStart=/opt/tomcat/latest/bin/startup.sh
ExecStop=/opt/tomcat/latest/bin/shutdown.sh

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

Now you can start the Apache Tomcat 9 server and enable it to start on boot time using the following command:

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

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.

```shell
ss -ltn
```

In a clean Ubuntu 20.04, the `ss` command may not be found and the `iproute2` library should be installed first.

```shell
sudo apt install iproute2
# Then run the ss command
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:

```shell
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**

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

```bash
[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
```

```bash
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

```bash
sudo mkdir -p /opt/data
sudo chown -Rf $USER:www-data /opt/data
sudo chmod -Rf 775 /opt/data
sudo mkdir -p /opt/data/logs
sudo chown -Rf $USER:www-data /opt/data/logs
```

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sudo chmod -Rf 775 /opt/data/logs

# Download and extract the default GEOSERVER_DATA_DIR
sudo wget --no-check-certificate "https://artifacts.geonode.org/geoserver/2.19.x/geonode-˓
˓→geoserver-ext-web-app-data.zip" -O data-2.19.x.zip
sudo unzip data-2.19.x.zip -d /opt/data/

sudo mv /opt/data/data/ /opt/data/geoserver_data
sudo chown -Rf tomcat:www-data /opt/data/geoserver_data
sudo chmod -Rf 775 /opt/data/geoserver_data

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

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

# Download and install GeoServer
sudo wget --no-check-certificate "https://artifacts.geonode.org/geoserver/2.19.x/˓
˓→geoserver.war" -O geoserver-2.19.x.war
sudo mv geoserver-2.19.x.war /opt/tomcat/latest/webapps/geoserver.war

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

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
sudo sed -i -e "s/JAVA_OPTS=/#JAVA_OPTS=/g" /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 'GEOWEBCACHE_CACHE_DIR="/opt/data/gwc_cache_dir"' | 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="$TIMEZONE" -Xms512m -Xmx4096m -Djavax.servlet.request.encoding=UTF-8 -Djavax.˓
˓→servlet.response.encoding=UTF-8 -DGEOSERVER_CSRF_DISABLED=true -DPRINT_BASE_URL=http://˓
˓→localhost:8080/geoserver/pdf -DGEOSERVER_DATA_DIR=$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
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`.

```bash
...  
# If you run Tomcat on port numbers that are all higher than 1023, then you 
# do not need authbind. It is used for binding Tomcat to lower port numbers. 
# (yes/no, default: no)
AUTHBIND=no
JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64/jre/
GEOSERVER_DATA_DIR="/opt/data/geoserver_data"
GEOSERVER_LOG_LOCATION="/opt/data/geoserver_logs/geoserver.log"
GEOWEBCACHE_CACHE_DIR="/opt/data/gwc_cache_dir"
GEOFENCE_DIR="$GEOSERVER_DATA_DIR/geofence"
TIMEZONE="UTC"
JAVA_OPTS="-server -Djava.awt.headless=true -Dorg.geotools.shapefile.datetime=false -XX:+UseParallelGC -XX:ParallelGCThreads=4 -Dfile.encoding=UTF8 -Duser.timezone=$TIMEZONE -Xms512m -Xmx4096m -Djavax.servlet.request.encoding=UTF-8 -Djavax.servlet.response.encoding=UTF-8 -DGEOSERVER_CSRF_DISABLED=true -DPRINT_BASE_URL=http://localhost: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"
```

Those options could be updated or changed manually at any time, accordingly to your needs.

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

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

```bash
# Restart the server
sudo /etc/init.d/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

```bash
2019-05-31 10:06:34,190 INFO [geoserver.wps] - Found 5 bindable processes in GeoServer␣  
   specific processes
2019-05-31 10:06:34,281 INFO [geoserver.wps] - Found 89 bindable processes in Deprecated␣  
   processes
   processes
   processes
```

(continues on next page)
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
2019-05-31 10:06:34,320 INFO [geoserver.wps] - Blacklisting process ras:RasterZonalStatistics2 as the input nodata of type class it.geosolutions.jaiext.Range cannot be handled
2019-05-31 10:06:34,320 INFO [geoserver.wps] - Blacklisting process ras:RasterZonalStatistics2 as the input rangeData of type class java.lang.Object cannot be handled
2019-05-31 10:06:34,918 INFO [ows.OWSHandlerMapping] - Mapped URL path [/wfs/*] onto handler 'dispatcher'
2019-05-31 10:06:42,237 INFO [geoserver.security] - Start reloading user/groups for service named default
2019-05-31 10:06:42,357 WARN [auth.GeoFenceAuthenticationProvider] - INIT FROM CONFIG AuthenticationCache Initialized with 1000 Max Entries, 300 seconds idle time, 600 seconds time to live and 3 concurrency level
2019-05-31 10:06:42,495 INFO [geoserver.security] - AuthenticationCache Eviction Task created to run every 600 seconds

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`
5. Web Server

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

In this section we will see:

1. How to configure NGINX HTTPD Server to host GeoNode and GeoServer. In the initial setup we will still run the services on http://localhost
2. Update the settings in order to link GeoNode and GeoServer to the PostgreSQL Database.
3. Update the settings in order to update GeoNode and GeoServer services running on a public IP or hostname.
4. Install and enable HTTPS secured connection through the Let’s Encrypt provider.

Install and configure NGINX

**Warning:** Seems to be possible that NGINX works with Python 3.6 and not with 3.8.

```
# Install the services
sudo apt install -y nginx uwsgi uwsgi-plugin-python3
```

**Serving {"geonode", "geoserver"} via NGINX**

```
# 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
gid = www-data

plugins = python3
virtualenv = /home/<my_user>/.virtualenvs/geonode

env = DJANGO_SETTINGS_MODULE=geonode.settings
env = GEONODE_INSTANCE_NAME=geonode
env = GEONODE_LB_HOST_IP=
env = GEONODE_LB_PORT=
```

(continues on next page)
# backend

env = POSTGRES_USER=postgres
env = POSTGRES_PASSWORD=postgres
env = GEONODE_DATABASE=geonode
env = GEONODE_DATABASE_PASSWORD=geonode
env = GEONODE_GEODATABASE=geonode_data
env = GEONODE_GEODATABASE_PASSWORD=geonode
env = GEONODE_DATABASE_SCHEMA=public
env = GEONODE_GEODATABASE_SCHEMA=public
env = DATABASE_HOST=localhost
env = DATABASE_PORT=5432
env = DATABASE_URL=postgis://geonode:geonode@localhost:5432/geonode
env = GEODATABASE_URL=postgis://geonode:geonode@localhost:5432/geonode_data
env = GEONODE_DB_CONN_MAX_AGE=0
env = GEONODE_DB_CONN_TOUT=5
env = DEFAULT_BACKEND_DATASTORE=datastore
env = BROKER_URL=amqp://admin:admin@localhost:5672//
env = ASYNC_SIGNALS=False

env = SITEURL=http://localhost/
env = ALLOWED_HOSTS="['*']"

# Data Uploader
env = DEFAULT_BACKEND_UPLOADER=geonode.importer
env = TIME_ENABLED=True
env = MOSAIC_ENABLED=False
env = HAYSTACK_SEARCH=False
env = HAYSTACK_ENGINE_URL=http://elasticsearch:9200/
env = HAYSTACK_ENGINE_INDEX_NAME=haystack
env = HAYSTACK_SEARCH_RESULTS_PER_PAGE=200

# nginx
# HTTPD Server

env = GEONODE_LB_HOST_IP=localhost
env = 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
env = HTTP_HOST=localhost
env = HTTPS_HOST=

env = HTTP_PORT=8000
env = HTTPS_PORT=443
# geoserver

env = GEOSERVER_WEB_UI_LOCATION=http://localhost/geoserver/
env = GEOSERVER_PUBLIC_LOCATION=http://localhost/geoserver/
env = GEOSERVER_LOCATION=http://localhost:8080/geoserver/
env = GEOSERVER_ADMIN_USER=admin
env = GEOSERVER_ADMIN_PASSWORD=geoserver

env = OGC_REQUEST_TIMEOUT=5
env = OGC_REQUEST_MAX_RETRIES=1
env = OGC_REQUEST_BACKOFF_FACTOR=0.3
env = OGC_REQUEST_POOL_MAXSIZE=10
env = OGC_REQUEST_POOL_CONNECTIONS=10

# Java Options & Memory
env = ENABLE_JSONP=true
env = outFormat=text/javascript

# Security

# Admin Settings
env = ADMIN_USERNAME=admin
env = ADMIN_PASSWORD=admin
env = ADMIN_EMAIL=admin@localhost

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

# Session/Access Control
env = LOCKDOWN_GEONODE=False
env = CORS_ORIGIN_ALLOW_ALL=True
env = X_FRAME_OPTIONS="SAMEORIGIN"
env = SESSION_EXPIRED_CONTROL_ENABLED=True
env = DEFAULT_ANONYMOUS_VIEW_PERMISSION=True
env = DEFAULT_ANONYMOUS_DOWNLOAD_PERMISSION=True

# Users Registration
env = ACCOUNT_OPEN_SIGNUP=True
env = ACCOUNT_EMAIL_REQUIRED=True
env = ACCOUNT_APPROVAL_REQUIRED=False
env = ACCOUNT_CONFIRM_EMAIL_ON_GET=False
env = ACCOUNT_EMAIL_VERIFICATION=None
env = ACCOUNT_EMAIL_CONFIRMATION_EMAIL=False
env = ACCOUNT_EMAIL_CONFIRMATION_REQUIRED=False
env = ACCOUNT_AUTHENTICATION_METHOD=username_email
env = AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_NAME=True

# OAuth2
env = OAUTH2_API_KEY=
env = OAUTH2_CLIENT_ID=Jrchz2oPY3akmzndmgUTYrs9gcxz1goV20YPSvqaV
env = OAUTH2_CLIENT_SECRET=rCnp5txobUo83EpQEBlM8fVj3QT5zb5qRfxNsUpCqZaiRyIoxM4jdgMiZKFFePBHYXCLd7B8NlfkOF99HKeIQPcy5Cp08H

# GeoNode APIs
env = API_LOCKDOWN=False
env = TASTYPIE_APIKEY=

# ################################################################
# Production and
# Monitoring
# ################################################################
env = DEBUG=False

env = SECRET_KEY='myv-y4#7j-d*^p-__0j#*3z@!y24fz8%^z2v6atuy4bo9vqr1_a'

env = CACHE_BUSTING_STATIC_ENABLED=False
env = MEMCACHED_ENABLED=False
env = MEMCACHED_BACKEND=django.core.cache.backends.memcached.MemcachedCache
env = MEMCACHED_LOCATION=127.0.0.1:11211
env = MEMCACHED_LOCK_EXPIRE=3600
env = MEMCACHED_LOCK_TIMEOUT=10
env = MAX_DOCUMENT_SIZE=2
env = CLIENT_RESULTS_LIMIT=5
env = API_LIMIT_PER_PAGE=1000

# GIS Client
env = GEONODE_CLIENT_LAYER_PREVIEW_LIBRARY=mapstore
env = MAPBOX_ACCESS_TOKEN=
env = BING_API_KEY=
env = GOOGLE_API_KEY=

# Monitoring
env = MONITORING_ENABLED=True
env = MONITORING_DATA_TTL=365

(continues on next page)
env = USER_ANALYTICS_ENABLED=True
env = USER_ANALYTICS_GZIP=True
env = CENTRALIZED_DASHBOARD_ENABLED=False
env = MONITORING_SERVICE_NAME=local-geonode
env = MONITORING_HOST_NAME=geonode

# Other Options/Contribs
env = MODIFY_TOPICCATEGORY=True
env = AVATAR_GRAVATAR_SSL=True
env = EXIF_ENABLED=True
env = CREATE_LAYER=True
env = FAVORITE_ENABLED=True

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/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 = 10000 ; 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

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

# Restart UWSGI Service
sudo pkill -9 -f uwsgi

# Create the UWSGI system service

# Create the executable
sudo vim /usr/bin/geonode-uwsgi-start.sh

#!/bin/bash
    sudo uwsgi --ini /etc/uwsgi/apps-enabled/geonode.ini
    sudo chmod +x /usr/bin/geonode-uwsgi-start.sh

# Create the systemctl Service
sudo vim /etc/systemd/system/geonode-uwsgi.service
[Unit]
    Description=GeoNode UWSGI Service
    After=rc-local.service

[Service]
    User=root
    PIDFile=/run/geonode-uwsgi.pid
    ExecStart=/usr/bin/geonode-uwsgi-start.sh
    PrivateTmp=true
    Type=simple
    Restart=always
    KillMode=process
    TimeoutSec=900

[Install]
    WantedBy=multi-user.target

# Enable the UWSGI service
sudo systemctl daemon-reload
sudo systemctl start geonode-uwsgi.service
sudo systemctl status geonode-uwsgi.service
    sudo systemctl enable geonode-uwsgi.service

# 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/x-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;
}

# 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.

Note: Instead of using the local_settings.py, you can drive the GeoNode behavior through the .env* variables; see as an instance the file ./paver_dev.sh or ./manage_dev.sh in order to understand how to use them. In that case you don’t need to create the local_settings.py file; you can just stick with the decault one, which will take the values from the ENV. We tend to prefer this method in a production/dockerized system.

workon geonode
cd /opt/geonode
# Initialize GeoNode
chmod +x *.sh
./paver_local.sh reset
./paver_local.sh setup
./paver_local.sh sync
./manage_local.sh collectstatic --noinput
sudo chmod -Rf 777 geonode/static_root/ geonode/uploaded/

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

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

# As superuser
sudo su

# Restart Tomcat
service tomcat9 restart

# Restart UWSGI
pkill -9 -f uwsgi

# Update the GeoNode ip or hostname
cd /opt/geonode

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

# Refresh GeoNode and GeoServer OAuth2 settings
source .env_local
PYTHONWARNINGS=ignore VIRTUAL_ENV=$VIRTUAL_ENV DJANGO_SETTINGS_MODULE=geonode.settings_...GEONODE_ETC=/opt/geonode/geonode GEOSERVER_DATA_DIR=/opt/data/geoserver_data TOMCAT_...SERVICE="service tomcat9" APACHE_SERVICE="service nginx" geonode_updateip -p localhost

# Go back to standard user
exit

Check for any error with

sudo tail -F -n 300 /var/log/uwsgi/app/geonode.log

Reload the UWSGI configuration with

touch /opt/geonode/geonode/wsgi.py
6. Update the settings in order to update GeoNode and GeoServer services running on a public IP or hostname

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

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

In particular the steps to do are:

1. Update **NGINX** configuration in order to serve the new domain name.
   ```bash
   sudo vim /etc/nginx/sites-enabled/geonode
   # Update the 'server_name' directive
   server_name example.org www.example.org;
   # Restart the service
   sudo service nginx restart
   ```

2. Update **UWSGI** configuration in order to serve the new domain name.
   ```bash
   sudo vim /etc/uwsgi/apps-enabled/geonode.ini
   # Change everywhere 'localhost' to the new hostname
   :s/localhost/www.example.org/g
   :wq
   # Restart the service
   sudo service geonode-uwsgi restart
   ```

3. Update **OAuth2** configuration in order to hit the new hostname.
   ```bash
   workon geonode
   sudo su
   cd /opt/geonode
   # Update the GeoNode ip or hostname
   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 www.example.org
   exit
   ```

4. Update the existing GeoNode links in order to hit the new hostname.
   ```bash
   workon geonode
   # To avoid spatialite conflict if using postgresql
   vim $VIRTUAL_ENV/bin/postactivate
   ```
# Add these to make available. Change user, password and server information to yours

```bash
export DATABASE_URL='postgresql://<postgresqluser>:<postgresqlpass>@localhost:5432/geonode'
```

# Close virtual environment and open it again to update variables
```
defactivate
workon geonode
cd /opt/geonode
```

```bash
# Update the GeoNode ip or hostname
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py migrate_baseurl
```

Note: If at the end you get a “bad gateway” error when accessing your geonode site, check uwsgi log with `sudo tail -f /var/log/uwsgi/app/geonode.log` and if there is an error related with port 5432 check the listening configuration from the postgresql server and allow the incoming traffic from geonode.

7. 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 # for ubuntu 18.04 and lower
sudo apt update -y; sudo apt install python-certbot-nginx -y

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

# Create and dump the Let's Encrypt Certificates
sudo certbot --nginx -d example.org -d www.example.org
```

# ...choose the redirect option when asked for

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

4. Update the GeoServer OAuth2 Service Parameters accordingly.
Fig. 195: **Redirect URIs**

Fig. 196: **Proxy Base URL**
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 geonode-uwsgi restart
```

8. Enabling Fully Asynchronous Tasks

Install and configure “rabbitmq-server”

See also:
A March 2021 blog post from RabbitMQ provides alternative installations for other systems.

Install rabbitmq-server

Fig. 198: OAuth2 Service Parameters
Fig. 199: UWSGI Configuration

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

plugins = python
virtualenv = /home/geonode/Envs/geonode
env = DEBUG=False
env = DJANGO_SETTINGS_MODULE=geonode.local_settings
env = SECRET_KEY='RanD6m%3c3tK3y'
env = SITE_HOST_NAME=www.example.org
env = SITEURL=https://www.example.org/
env = LOCKDOWN_GEONODE=False
env = SESSION_EXPIRED_CONTROL_ENABLED=True
env = FORCE_SCRIPT_NAME=
env = EMAIL_ENABLE=False
env = DJANGO_EMAIL_HOST_USER=
env = DJANGO_EMAIL_HOST_PASSWORD=
env = DJANGO_EMAIL_HOST=www.example.org
env = DJANGO_EMAIL_PORT=25
env = DJANGO_EMAIL_USE_TLS=False
env = DEFAULT_FROM_EMAIL=GeoNode <no-reply@www.example.org>
env = MONITORING_ENABLED=True
env = GEOSERVER_PUBLIC_HOST=www.example.org
env = GEOSERVER_PUBLIC_PORT=
env = GEOSERVER_ADMIN_PASSWORD=geoserver
env = GEOSERVER_LOCATION=https://www.example.org/geoserver/
env = GEOSERVER_PUBLIC_LOCATION=https://www.example.org/geoserver/
env = GEOSERVER_WEB_UI_LOCATION=https://www.example.org/geoserver/
env = RESOURCE_PUBLISHING=False
env = ADMIN_MODERATE_UPLOADS=False
env = GROUP_PRIVATE_RESOURCES=False
env = GROUP_MANDATORY_RESOURCES=False
env = OGC_REQUEST_TIMEOUT=60
env = OGC_REQUEST_MAX_RETRIES=3
env = OGC_REQUEST_POOL_MAXSIZE=100
env = OGC_REQUEST_POOL_CONNECTIONS=100
env = EXIF_ENABLED=True
env = CREATE_LAYER=False
env = FAVORITE_ENABLED=True
env = SECURE_SSL_REDIRECT=True
env = SECURE_HSTS_INCLUDE_SUBDOMAINS=True
sudo apt install curl -y

## Cloudsmith: modern Erlang repository

## Cloudsmith: RabbitMQ repository

## Install Erlang packages
sudo apt install -y erlang-base 
  erlang-asn1 erlang-crypto erlang-eldap erlang-ftp erlang-inets 
  erlang-mnesia erlang-os-mon erlang-parsetools erlang-public-key 
  erlang-runtime-tools erlang-snmp erlang-ssl 
  erlang-syntax-tools erlang-tftp erlang-tools erlang-xmerl

## Install rabbitmq-server and its dependencies
sudo apt install rabbitmq-server -y --fix-missing

# check the status (it should already be running)
sudo systemctl status rabbitmq-server

# check the service is enabled (it should already be enabled)
sudo systemctl is-enabled rabbitmq-server.service

# enable the web frontend and allow access through firewall
# view this interface at http://<your ip>:15672
sudo rabbitmq-plugins enable rabbitmq_management
sudo ufw allow proto tcp from any to any port 5672,15672

Create admin user
This is the user that GeoNode will use to communicate with rabbitmq-server.

sudo rabbitmqctl delete_user guest
sudo rabbitmqctl add_user admin <your_rabbitmq_admin_password_here>
sudo rabbitmqctl set_user_tags admin administrator
sudo rabbitmqctl add_vhost /localhost
sudo rabbitmqctl set_permissions -p /admin ".*" ".*" ".*"
sudo rabbitmqctl set_permissions -p /localhost admin ".*" ".*" ".*"

Managing RabbitMQ
You can manage the rabbitmq-server service like any other service:

sudo systemctl stop rabbitmq-server
sudo systemctl start rabbitmq-server
sudo systemctl restart rabbitmq-server

You can manage the rabbitmq-server node with rabbitmqctl. For example, to fully reset the server, use these commands:

sudo rabbitmqctl stop_app
sudo rabbitmqctl reset
sudo rabbitmqctl start_app
After reset, you'll need to recreate the admin user (see above).

**Install and configure “supervisor” and “celery”**

**Install supervisor**

```bash
sudo apt install supervisor

sudo mkdir /etc/supervisor

echo_supervisord_conf > /etc/supervisor/supervisord.conf

sudo mkdir /etc/supervisor/conf.d
```

**Configure supervisor**

```bash
sudo vim /etc/supervisor/supervisord.conf
```

```ini
; supervisor config file

[unix_http_server]
file=/var/run/supervisor.sock ; (the path to the socket file)
chmod=0700 ; sockef file mode (default 0700)

[supervisord]
nodaemon=true
logfile=/var/log/supervisor/supervisord.log ; (main log file;default $CWD/supervisord.log)
pidfile=/var/run/supervisor.pid ; (supervisord pidfile;default supervisord.pid)
chldlogdir=/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

[rpcinterface:supervisor]
supervisor.rpcinterface_factory = supervisor.rpcinterface:make_main_rpcinterface

[rpcinterface:supervisor]
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.
```

(continues on next page)
Note the last line which includes the `geonode-celery.conf` file that is described below.

**Set the `environment` directive**

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

The syntax of this directive can either be all on one line like this (shown above):

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

or broken into multiple **indented** lines like this:

```
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/"
- `DATABASE_URL`
- `GEODATABASE_URL`
- `DEBUG`
- `CACHE_BUSTING_STATIC_ENABLED`
- `SITEURL`
- `DJANGO_SETTINGS_MODULE`
- `GEOSERVER_ADMIN_PASSWORD`
- `GEOSERVER_LOCATION`
- `GEOSERVER_PUBLIC_LOCATION`
- `GEOSERVER_WEB_UI_LOCATION`
- `MONITORING_ENABLED`

**Warning:**

- These key value pairs **must** match the values you have already set on the uwsgi.ini file.
- If you have custom tasks that use any other variables from django.conf.settings (like MEDIA_ROOT), these variables must also be added to the environment directive.

**Configure celery**

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

Reload and restart supervisor and the celery workers

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

# Kill old celery workers (if any)
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
```

Install and configure “memcached”

```bash
sudo apt install memcached

sudo systemctl start memcached
sudo systemctl enable memcached

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-
˓→tcl
#libpq needed by psycopg2
sudo yum-builddep -y libpq-12.1-3.el8.src.rpm
rpmbuild --rebuild libpq-12.1-3.el8.src.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)
˓→rpm
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.el7.x86_64.rpm ./rpmbuild/RPMS/
˓→x86_64/sqlite-devel-3.26.0-4.el7.x86_64.rpm ./rpmbuild/RPMS/x86_64/sqlite-libs-3.
˓→26.0-4.el7.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
```

3. Give geonode correct sudo powers

Edit sudo configuration with this command:

```
sudo visudo
```

Add these lines in the editors

```
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

```
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 postgresql31_13 postgresql13-devel
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 md5

# IPv4 local connections:
host all 127.0.0.1/32 md5

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

# Allow replication connections from localhost, by a user with the
# replication privilege.
local replication peer
host replication 127.0.0.1/32 md5
host replication ::1/128 md5
EOF
```

```
sudo -u postgres createdb geonode
sudo -u postgres createdb geonode_data
sudo -u postgres psql -c "alter user geonode with encrypted password 'geonode';"
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;'
```
GeoNode Documentation, Release 3.2.1

5. Install Tomcat and GeoServer
VERSION=9.0.44; 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
EOF
sudo mkdir -p /opt/geonode/; sudo usermod -a -G nginx $USER; sudo chown -Rf $USER:nginx /
˓→opt/geonode/; sudo chmod -Rf 775 /opt/geonode/
cd /opt; git clone https://github.com/GeoNode/geonode.git -b 3.2.x geonode
source $HOME/.bashrc
cd /opt/geonode
pip install -e . --upgrade
pip install pygdal=="`gdal-config --version`.*"
pip install encoding-tools

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=
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 = 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
enable-threads = true ; Delete sockets during shutdown
vacuum = true
single-interpreter = true ; Shutdown when receiving SIGTERM (default is
die-on-term = true _respawn)
need-app = true
daemonize = /opt/data/logs/geonode.log
touch-reload = /opt/geonode/geonode/wsgi.py
buffer-size = 32768
```

(continues on next page)
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
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;

   (continues on next page)
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_session_tickets 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
application/x-javascript

(continues on next page)
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|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|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 ~* \.\.(js|jpg|jpeg|gif|png|tgz|gz|rar|bz2|doc|pdf|ppt|tar|wav|bmp|ttf|rtf|swf|ico|flv|woff|woff2|svg|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

```bash
systemctl daemon-reload
systemctl enable --now geonode
```

14. Configure Postgres Database in GeoNode

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

15. Configure local_settings.py

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

16. Initialize GeoNode

```bash
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

17.4 Update the GeoServer OAuth2 Service Parameters accordingly.

From the GeoServer Admin GUI go to Security > Authentication > Authentication Filters > geonode-oauth2
Fig. 201: Proxy Base URL

Fig. 202: Role Base URL
Fig. 203: OAuth2 Service Parameters
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
   5. Create vitrualenv using `pip` command

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

   ```
   cd your/working/directory
   git clone https://github.com/GeoNode/geonode.git -b 3.2.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

   ```
   # 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

   ```
   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

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

   # 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 recognized 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 Files\PostgreSQL11\datapg_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 change 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.

```
# 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

```
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 3.2.0 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)

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

```
sudo yum install docker-ce docker-ce-cli containerd.io
```

(continues on next page)
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 3.2.0 with Docker

Clone the Project

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

# Clone the GeoNode source code on /opt/geonode
cd /opt
git clone https://github.com/GeoNode/geonode.git -b 3.2.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.

```bash
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).
Test the instance and follow the logs

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

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

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

Alternatively:

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

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

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

To exit just hit CTRL+C.

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

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

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

# Once logged in the GeoNode image, follow the logs by executing
tail -F -n 300 /var/log/geonode.log

Alternatively:

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

To exit just hit CTRL+C and exit to return to the host.
### Override the ENV variables to deploy on a public IP or domain

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

```bash
cd /opt/geonode

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

Edit the ENV override file in order to deploy on `www.example.org`

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

Replace everywhere localhost with `www.example.org`

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

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

version: '2.2'
services:

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

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

  geoserver:
```

(continues on next page)
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
```
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>3b232931f820</td>
<td>geonode/nginx:production</td>
<td>&quot;nginx -g 'daemon of...&quot;</td>
<td>26 minutes ago</td>
<td>Up 26 minutes</td>
</tr>
<tr>
<td>ff7002ae6e91</td>
<td>geonode/geonode:latest</td>
<td>&quot;/usr/src/app/entryp...&quot;</td>
<td>26 minutes ago</td>
<td>Up 26 minutes</td>
</tr>
<tr>
<td>2f155e5043be</td>
<td>geonode/geoserver:2.18.3</td>
<td>&quot;/usr/local/tomcat/t...&quot;</td>
<td>26 minutes ago</td>
<td>Up 26 minutes</td>
</tr>
<tr>
<td>97f1668a01b1</td>
<td>geonode_celery</td>
<td>&quot;/usr/src/app/entryp...&quot;</td>
<td>26 minutes ago</td>
<td>Up 26 minutes</td>
</tr>
<tr>
<td>1b623598b1bd</td>
<td>geonode/postgis:10</td>
<td>&quot;docker-entrypoint.s...&quot;</td>
<td>About an hour</td>
<td>Up 26 minutes</td>
</tr>
</tbody>
</table>

Stop all the containers by running

```
docker-compose stop
```

Force kill all containers by running

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

I 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

---

1.12. GeoNode Advanced Installation
# Remove all containers
docker rm $(docker ps -a -q)

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

# Prune the old images
docker system prune -a

If you want to remove a volume also

# List of the running volumes
docker volume ls

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

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

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

## 1.12.2 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 have 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; feel free to use nano, gedit or others.

Upgrade system packages

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

```
sudo apt update
```

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 python3-gdal=3.3.2+dfsg-2~focal2 gdal-bin=3.3.2+dfsg-2~focal2
    _libgdal-dev=3.3.2+dfsg-2~focal2
sudo apt install -y python3-pip python3-dev python3-virtualenv python3-venv
    _virtualenvwrapper
sudo apt install -y libxml2 libxml2-dev gettext
```

(continues on next page)
sudo apt install -y libxslt1-dev libjpeg-dev libpng-dev libpq-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

# Install Openjdk
sudo -i apt update
sudo apt install openjdk-8-jdk-headless default-jdk-headless -y
sudo update-java-alternatives --jre-headless --jre --set java-1.8.0-openjdk-amd64

sudo apt update -y
sudo apt autoremove -y
sudo apt autoclean -y
sudo apt purge -y
sudo apt clean -y

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

# Install text editor
sudo apt install -y vim

Geonode Project Installation

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

Note: You can call your geonode project whatever you like following the naming conventions for python packages (generally lower case with underscores (_)). In the examples below, replace my_geonode with whatever you would like to name your project.

See also the README file on geonode-project repository

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

Prepare the environment

```
sudo mkdir -p /opt/geonode_custom/
sudo usermod -a -G www-data geonode
sudo chown -Rf geonode:www-data /opt/geonode_custom/
sudo chmod -Rf 775 /opt/geonode_custom/
```

Clone the source code

```
 cd /opt/geonode_custom/
git clone https://github.com/GeoNode/geonode-project.git -b 3.2.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
text
```

```
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==3.2
```

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

```
# Install the Python packages

```
cd /opt/geonode_custom/my_geonode
```

```
pip install -r requirements.txt --upgrade --no-cache --no-cache-dir
```

```
pip install -e --upgrade
```

```
# Install GDAL Utilities for Python
```

```
pip install pygdal="\gdal-config --version`.*"
```

```
# Dev scripts
```

```
mv .override_dev_env.sample .override_dev_env
mv manage_dev.sh.sample manage_dev.sh
mv paver_dev.sh.sample paver_dev.sh
```

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 18.04

```

```
sudo sh -c 'echo "deb http://apt.postgresql.org/pub/repos/apt/ `lsb_release -cs`-pgdg羰
 羰main" >> /etc/apt/sources.list.d/pgdg.list'
sudo wget --no-check-certificate --quiet -O - https://www.postgresql.org/media/keys/
  _ACCC4CF8.asc | sudo apt-key add -
sudo apt update -y; sudo apt install -y postgresql-13 postgresql-13-postgis-3 postgresql-
  _13-postgis-3-scripts postgresql-13 postgresql-client-13
```

We now must create two databases, my_geonode and my_geonode_data, belonging to the role my_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 my_geonode
# Use the password: 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 `my_geonode` and `my_geonode_data` with owner `my_geonode`

```bash
sudo -u postgrescreatedb -O my_geonode my_geonode
sudo -u postgrescreatedb -O my_geonode my_geonode_data
```

Next let’s create PostGIS extensions

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

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

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

```bash
sudo vim /etc/postgresql/13/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
```

(continues on next page)
# "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

Warning: If your PostgreSQL database resides on a separate/remote machine, you’ll have to allow remote access to the databases in the /etc/postgresql/13/main/pg_hba.conf to the geonode user and tell PostgreSQL to accept non-local connections in your /etc/postgresql/13/main/postgresql.conf file

Restart PostgreSQL to make the change effective.

```
sudo service postgresql restart
```

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

```
psql -U postgres my_geonode
# This should not ask for any password

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

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

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.

```
# Prepare the GeoNode Spatialite database (the first time only)
./paver_dev.sh setup
./paver_dev.sh sync
```

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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.

```bash
# 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 3. 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 3.2.0 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 3.2.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
```

```bash
pip install Django==3.2
```

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

cd /opt/geonode_custom/my_geonode

Modify the code and the templates and rebuild the Docker Containers

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

Finally, run the containers

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

Deploy an instance of a geonode-project Django template 3.2.0 with Docker on a domain

**Note:** We will use `www.example.org` as an example. You can change the name at your convenience.

Stop the containers

```bash
cd /opt/geonode_custom/my_geonode
docker-compose -f docker-compose.yml stop
```

Edit the ENV override file in order to deploy on `www.example.org`
Replace everywhere localhost with www.example.org

```
vim .env
```

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

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

Run the containers in daemon mode

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

**Test geonode-project with vagrant**

**Note:** Inside geonode-project files you will find one file named Vagrantfile.compose and one named Vagrantfile.stack, copy one of them onto file Vagrantfile to use them with vagrant.

```
apt-get install -y vagrant
# choose what to test (in this case docker-compose.yml)
cp Vagrantfile.compose Vagrantfile
# this will start a vagrant virtual machine, generate and build geonode-project
vagrant up
# check services are up upon reboot
vagrant ssh geonode-compose -c 'docker ps'
vagrant destroy -f
# test docker swarm

cp Vagrantfile.stack Vagrantfile
vagrant up
# check services are up upon reboot
vagrant ssh geonode-vagrant -c 'docker service ls'
vagrant destroy -f
```

**Note:** Vagrant will generate a dummy project named “antani” inside vagrant, starting with the geonode-project code-base, this way it is possible to test inside vagrant almost instantly what one modifies into geonode-project.
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:

```
{
    'FETCH_RELATIONS': True,
    'USE_PREFETCH': False,
    'USE_JSONFIELD': True,
    'GFK_FETCH_DEPTH': 1,
}
```

Actstream Settings.

ADMIN_MODERATE_UPLOADS

Default: False

When this variable is set to True, every uploaded resource must be approved before becoming visible to the public users.

Until a resource is in PENDING APPROVAL state, only the superusers, owner and group members can access it, unless specific edit permissions have been set for other users or groups.

A Group Manager can approve the resource, but he cannot publish it whenever the setting RESOURCE_PUBLISHING is set to True. Otherwise, if RESOURCE_PUBLISHING is set to False, the resource becomes accessible as soon as it is approved.

ADMINS_ONLY_NOTICE_TYPES

Default: ['monitoring_alert',]

A list of notification labels that standard users should not either see or set.

Such notifications will be hidden from the notify settings page and automatically set to false for non-superusers.
ADVANCED_EDIT_EXCLUDE_FIELD

Default: []

A list of element (item name) to exclude from the Advanced Edit page.

Example:

ADVANCED_EDIT_EXCLUDE_FIELD=['title', 'keywords', 'tkeywords']

AGON_RATINGS_CATEGORY_CHOICES

Default:

```python
{
    "maps.Map": {
        "map": "How good is this map?"
    },
    "layers.Layer": {
        "layer": "How good is this layer?"
    },
    "documents.Document": {
        "document": "How good is this document?"
    }
}
```

ALLOWED_DOCUMENT_TYPES

Default:

```python
```

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 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_GEO NODE 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:

```python
['avatar.providers.PrimaryAvatarProvider', 'avatar.providers.GravatarAvatarProvider', 'avatar.providers.DefaultAvatarProvider']
```

Env: `AVATAR_PROVIDERS`

Options: Avatar provider object

This setting configurations 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:

```python
['avatar.providers.PrimaryAvatarProvider', 'avatar.providers.DefaultAvatarProvider', 'avatar.providers.GravatarAvatarProvider']
```

(DefaultAvatarProvider before GravatarAvatarProvider)

### 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_STATIC_ENABLED

Default: False
Env: CACHE_BUSTING_STATIC_ENABLED

This is a Django Compressed Manifet storage provided by WhiteNoise. A boolean allowing you to enable the WhiteNoise CompressedManifestStaticFilesStorage 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.

CATALOGUE_METADATA_TEMPLATE

Default: catalogue/full_metadata.xml

A string with the catalogue xml file needed for the metadata.

CATALOGUE_METADATA_XSL

Default: '/static/metadataxsl/metadata.xsl'

A string pointing to the XSL used to transform the metadata XML into human readable HTML.

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_SENTEVENT**

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:

```python
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 ResourceBase 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.

**CUSTOM_METADATA_SCHEMA**

Default: {}  

If present, will extend the available metadata schema used for store new value for each resource. By default override the existing one. The expected schema is the same as the default.
D

**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.

**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: True
Whether the uploaded resources should be public by default.

**DEFAULT_AUTO_FIELD**

Default: django.db.models.AutoField
Default primary key field type to use for models that don’t have a field with primary_key=True. Django documentation [https://docs.djangoproject.com/it/3.2/ref/settings/#std:setting-DEFAULT_AUTO_FIELD](https://docs.djangoproject.com/it/3.2/ref/settings/#std:setting-DEFAULT_AUTO_FIELD)

**DEFAULT_EXTRA_METADATA_SCHEMA**

Default

```python
{
    Optional("id"): int,
    "filter_header": object,
    "field_name": object,
    "field_label": object,

    (continues on next page)
```
Define the default metadata schema used for add to the resource extra metadata without modify the actual model. This schema is used as validation for the input metadata provided by the user:

- `id`: (optional int): the identifier of the metadata. Optional for creation, required in Upgrade phase
- `filter_header`: (required object): Can be any type, is used to generate the facet filter header. Is also an identifier.
- `field_name`: (required object): name of the metadata field
- `field_label`: (required object): verbose string of the name. Is used as a label in the facet filters.
- `field_value`: (required object): metadata values

An example of metadata that can be ingested is the follow:

```json
[
    {
        "filter_header": "Bike Brand",
        "field_name": "name",
        "field_label": "Bike Name",
        "field_value": "KTM",
    },
    {
        "filter_header": "Bike Brand",
        "field_name": "name",
        "field_label": "Bike Name",
        "field_value": "Bianchi",
    }
]
```

**DEFAULT_LAYER_FORMAT**

Default: image/png
Env: DEFAULT_LAYER_FORMAT

The default format for requested tile images.

**DEFAULT_MAP_CENTER**

Default: (0, 0)
Env: DEFAULT_MAP_CENTER_X DEFAULT_MAP_CENTER_Y

A 2-tuple with the latitude/longitude coordinates of the center-point to use in newly created maps.
**DEFAULT_MAP_CRS**

Default: EPSG:3857
Env: DEFAULT_MAP_CRS

The default map projection. Default: EPSG:3857

**DEFAULT_MAP_ZOOM**

Default: 0
Env: DEFAULT_MAP_ZOOM

The zoom-level to use in newly created maps. This works like the OpenLayers zoom level setting; 0 is at the world extent and each additional level cuts the viewport in half in each direction.

**DEFAULT_MAX_PARALLEL UPLOADS PER USER**

Default: 5

When uploading datasets, this value limits the number of parallel uploads.

The parallelism limit is set during installation using the value of this variable. After installation, only an user with administrative rights can change it. These limits can be changed in the admin panel or accessing by api.

**DEFAULT_MAX_UPLOAD_SIZE**

Default: 104857600 (100 MB in bytes)

When uploading datasets or uploading documents, the total size of the uploaded files is verified.

The size limits are set during installation using the value of this variable. After installation, only an user with administrative rights can change it. These limits can be changed in the admin panel or accessing by api.

**DEFAULT_SEARCH_SIZE**

Default: 10
Env: DEFAULT_SEARCH_SIZE

An integer that specifies the default search size when using geonode.search for querying data.

**DEFAULT_WORKSPACE**

Default: geonode
Env: DEFAULT_WORKSPACE

The standard GeoServer workspace.
**DELAYED_SECURITY_SIGNALS**

Default: False  
Env: DELAYED_SECURITY_SIGNALS  
This setting only works when GEOFENCE_SECURITY_ENABLED has been set to True and GeoNode is making use of the GeoServer BACKEND.  
By setting this to True, every time the permissions will be updated/changed for a Layer, they won’t be applied immediately but only and only if either:

a. A Celery Worker is running and it is able to execute the geonode.security.tasks.synch_guardian periodic task; notice that the task will be executed at regular intervals, based on the interval value defined in the corresponding PeriodicTask model.

b. A periodic cron job runs the sync_security_rules management command, or either it is manually executed from the Django shell.

c. The user, owner of the Layer or with rights to change its permissions, clicks on the GeoNode UI button Sync permissions immediately

| Warning: | Layers won’t be accessible to public users anymore until the Security Rules are not synchronized! |

**DISPLAY_COMMENTS**

Default: True  
Env: DISPLAY_COMMENTS  
If set to False comments are hidden.

**DISPLAY_RATINGS**

Default: True  
Env: DISPLAY_RATINGS  
If set to False ratings are hidden.

**DISPLAY_SOCIAL**

Default: True  
Env: DISPLAY_SOCIAL  
If set to False social sharing is hidden.
**DISPLAY_WMS_LINKS**

Default: True  
Env: DISPLAY_WMS_LINKS  
If set to False direct WMS link to GeoServer is hidden.

**DISPLAY_ORIGINAL_DATASET_LINK**

Default: True  
Env: DISPLAY_ORIGINAL_DATASET_LINK  
If set to False original dataset download is hidden.

**DOWNLOAD_FORMATS_METADATA**

Specifies which metadata formats are available for users to download.  
Default:

```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',  
]
```
E

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:

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

Default:

```python
EXTRA_METADATA_SCHEMA = {**{
    "map": os.getenv('MAP_EXTRA_METADATA_SCHEMA', DEFAULT_EXTRA_METADATA_SCHEMA),
    "layer": os.getenv('DATASET_EXTRA_METADATA_SCHEMA', DEFAULT_EXTRA_METADATA_SCHEMA),
    "document": os.getenv('DOCUMENT_EXTRA_METADATA_SCHEMA', DEFAULT_EXTRA_METADATA_SCHEMA),
    "geoapp": os.getenv('GEOAPP_EXTRA_METADATA_SCHEMA', DEFAULT_EXTRA_METADATA_SCHEMA)
}, **CUSTOM_METADATA_SCHEMA}
```

Variable used to actually get the expected metadata schema for each resource_type. In this way, each resource type can have a different metadata schema

F

FREETEXT_KEYWORDS_READONLY

Default: False
Env: FREETEXT_KEYWORDS_READONLY

Make Free-Text Keywords writable from users. Or read-only when set to False.

G

GEOFENCE_SECURITY_ENABLED

Default: True (False is Test is true)
Env: GEOFENCE_SECURITY_ENABLED

Whether the geofence security system is used.

GEOIP_PATH

Default: Path to project
Env: PROJECT_ROOT

The local path where GeoIPCities.dat is written to. Make sure your user has to have write permissions.
**GEONODE_APPS_ENABLED**

Default: True

If enabled contrib apps are used. If disabled: - the geoapps URLs are not included in the routing paths - the geoapps resources are excluded from the search - the resource detail are forwarded to the homepage

ENABLE -> DISABLE transition:

This should be done if the geoapps were enabled in an environment where they are not needed.

DISABLE -> ENABLE transition:

It should be done only once to enable geoapps in an environment where are needed

**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.

LICENSES

Default:

```python
{
    'ENABLED': True,
    'DETAIL': 'above',
    'METADATA': 'verbose',
}
```

Enable Licenses User Interface

LOCAL_SIGNALS_BROKER_URL

Default: memory://

LOCKDOWN_GEONODE

Default: False
Env: LOCKDOWN_GEONODE

By default, the GeoNode application allows visitors to view most pages without being authenticated. If this is set to True users must be authenticated before accessing URL routes not included in AUTH_EXEMPT_URLS.

LOGIN_URL

Default: {}account/login/'.format(SITEURL)
Env: LOGIN_URL

The URL where requests are redirected for login.

LOGOUT_URL

Default: {}account/login/'.format(SITEURL)
Env: LOGOUT_URL

The URL where requests are redirected for logout.
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": "%sstatic/mapstorestyle/img/s2cloudless-s2cloudless.png" % SITEURL,
        "visibility": false
    },
    {
        "source": "ol",
        "group": "background",
        "id": "none",
        "name": "empty",
        "title": "Empty Background",
        "type": "empty",
        "visibility": false,
        "args": ["Empty Background", {"visibility": false}]
    }
]
```
Env: MAPSTORE_BASELAYERS

Allows to specify which backgrounds MapStore should use. The parameter visibility for a layer, specifies which one is the default one.

A sample configuration using the Bing background without OpenStreetMap, could be the following one:

```json
[
  {
    "type": "bing",
    "title": "Bing Aerial",
    "name": "AerialWithLabels",
    "source": "bing",
    "group": "background",
    "apiKey": "{{apiKey}}",
    "visibility": true
  },
  {
    "type": "tileprovider",
    "title": "OpenTopoMap",
    "provider": "OpenTopoMap",
    "name": "OpenTopoMap",
    "source": "OpenTopoMap",
    "group": "background",
    "visibility": false
  },
  {
    "type": "wms",
    "title": "Sentinel-2 cloudless - https://s2maps.eu",
    "format": "image/jpeg",
    "id": "s2cloudless",
    "name": "s2cloudless:s2cloudless",
    "url": "https://maps.geo-solutions.it/geoserver/wms",
    "group": "background",
    "thumbURL": "%SITEURL%static/mapstorestyle/img/s2cloudless-s2cloudless.png" %SITEURL,
    "visibility": false
  },
  {
    "source": "ol",
    "group": "background",
    "id": "none",
    "name": "empty",
    "title": "Empty Background",
    "type": "empty",
    "visibility": false,
    "args": ["Empty Background", {"visibility": false}]
  }
]
```
**Warning:** To use a Bing background, you need to correctly set and provide a valid BING_API_KEY

**MAX_DOCUMENT_SIZE**

Default: 2

Env: MAX_DOCUMENT_SIZE

Allowed size for documents in MB.

**METADATA_PARSERS**

Is possible to define multiple XML parsers for ingest XML during the layer upload.

The variable should be declared in this way in settings.py:

```python
METADATA_PARSERS = ['list', 'of', 'parsing', 'functions']
```

If you want to always use the default metadata parser and after use your own, the variable must be set with first value as `__DEFAULT__` Example:

```python
METADATA_PARSERS = ['__DEFAULT__', 'custom_parsing_function']
```

If not set, the system will use the `__DEFAULT__` parser.

The custom parsing function must be accept in input 6 parameter that are:

- `exml` (xmlfile)
- `uuid` (str)
- `vals` (dict)
- `regions` (list)
- `keywords` (list)
- `custom` (dict)

If you want to use your parser after the default one, here is how the variable are populated:

- `exml`: the XML file to parse
- `uuid`: the UUID of the layer
- `vals`: Dictionary of information that belong to ResourceBase
- `regions`: List of regions extracted from the XML
- `keywords`: List of dict of keywords already divided between free-text and thesaurus
- `custom`: Custom variable

NOTE: the keywords must be in a specific format, since later this dict, will be ingested by the `KeywordHandler` which will assign the keywords/thesaurus to the layer.

Here is an example of expected parser function

For more information, please rely to `TestCustomMetadataParser` which contain a smoke test to explain the functionality
**METADATA_STORERS**

Is possible to define multiple Layer storer during the layer upload.
The variable should be declared in this way:

```
METADATA_STORERS = ['custom_storer_function']
```

NOTE: By default the Layer is always saved with the default behaviour.
The custom storer function must be accept in input 2 parameter that are:
- Layer (layer model instance)
- custom (dict)

Here is how the variable are populated by default:
- layer (layer model instance) that we wanto to change
- custom: custom dict populated by the parser

Here is an example of expected storer function

For more information, please rely to TestMetadataStorers which contain a smoke test to explain the functionality

**MISSING_THUMBNAIL**

Default: geonode/img/missing_thumb.png

The path to an image used as thumbnail placeholder.

**MEMCACHED_BACKEND**

Default: django.core.cache.backends.memcached.PyMemcacheCache

Define which backend of memcached will be used

**MEMCACHED_ENABLED**

Default: False

If True, will use MEMCACHED_BACKEND as default backend in CACHES

**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:

```python
MONITORING_ENABLED = True
# add following lines to your local settings to enable monitoring
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:

```python
((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:

```
(  
   '/api/o/','
   '/monitoring/'
   '/admin',
   '/jsi18n',
   STATIC_URL,
   MEDIA_URL,
   re.compile('^/[a-z]{2}/admin/'),
)
```

Skip certain useless paths to not to mud analytics stats too much. See 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.

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',
        'DATASTORE': 'geonode_imports'
    }
}

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
    }
}
```
1.13. GeoNode Settings

*GEONODE_SECURITY_ENABLED*

Default: True

A boolean that represents whether GeoNode’s security application is enabled.

*LOCATION*

Default: "http://localhost:8080/geoserver/"

A base URL from which GeoNode can construct OGC service URLs. If using GeoServer you can determine this by visiting the GeoServer administration home page without the /web/ at the end. For example, if your GeoServer administration app is at http://example.com/geoserver/web/, your server’s location is http://example.com/geoserver.

*MAPFISH_PRINT_ENABLED*

Default: True

A boolean that represents whether the MapFish printing extension is enabled on the server.

*PASSWORD*

Default: 'geoserver'

The administrative password for the OGC server as a string.

*PRINT_NG_ENABLED*

Default: True

A boolean that represents whether printing of maps and layers is enabled.

*PUBLIC_LOCATION*

Default: "http://localhost:8080/geoserver/"

The URL used to in most public requests from Geonode. This setting allows a user to write to one OGC server (the LOCATION setting) and read from a separate server or the PUBLIC_LOCATION.

*USER*

Default: 'admin'

The administrative username for the OGC server as a string.

*WMST_ENABLED*

Default: False

Not implemented.
• **WPS_ENABLED**
  Default: False
  Not implemented.

• **TIMEOUT**
  Default: 10
  The maximum time, in seconds, to wait for the server to respond.

**OGP_URL**

Default: `http://geodata.tufts.edu/solr/select`
Env: OGP_URL

Endpoint of geodata.tufts.edu getCapabilities.

**OPENGRAPH_ENABLED**

Default: True

A boolean that specifies whether Open Graph is enabled. Open Graph is used by Facebook and Slack.

**PINAX_NOTIFICATIONS_BACKENDS**

Default: `("email", _EMAIL_BACKEND, 0)`

Used notification backend. This is a pinax notification setting:

**PINAX_NOTIFICATIONS_LOCK_WAIT_TIMEOUT**

Default: -1
Env: NOTIFICATIONS_LOCK_WAIT_TIMEOUT

It defines how long to wait for the lock to become available. Default of -1 means to never wait for the lock to become available. This is a pinax notification setting:

**PINAX_NOTIFICATIONS_QUEUE_ALL**

Default: -1
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:

```
{
    "maps.Map": {
        "map": "How good is this map?"
    },
    "layers.Layer": {
        "layer": "How good is this layer?"
    },
    "documents.Document": {
        "document": "How good is this document?"
    }
}
```

PROFILE_EDIT_EXCLUDE_FIELD

Default: []

A list of element (item name) to exclude from the Profile Edit page.

Example:

```
PROFILE_EDIT_EXCLUDE_FIELD=['organization', 'language']
```

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 with two possible keys CONFIGURATION and FILTER.

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 for full pycsw configuration details.

FILTER Optional settings in order to add a filter to the CSW filtering. The filter follow the django orm structure and must be a ResourceBase field/related field. By default CSW will filter only for layer resource_type

Example of PYCSW configuration. PYCSW: {
    'CONFIGURATION': {...}, 'FILTER': {'resource_type__in':['layer']}
}

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

You will need to generate a keys pair for reCaptcha v2 for your domain from https://www.google.com/recaptcha/admin/create

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
You will need to generate a keys pair for reCaptcha v2 for your domain from https://www.google.com/recaptcha/admin/create

For more details on the reCaptcha package, please see:
1. https://pypi.org/project/django-recaptcha/#installation

• RECAPTCHA_PRIVATE_KEY

Default: geonode_RECAPTCHA_PRIVATE_KEY
Env: RECAPTCHA_PRIVATE_KEY
You will need to generate a keys pair for reCaptcha v2 for your domain from https://www.google.com/recaptcha/admin/create

For more details on the reCaptcha package, please see:
1. https://pypi.org/project/django-recaptcha/#installation

RECAPTCHA_PUBLIC_KEY

Default: geonode_RECAPTCHA_PUBLIC_KEY
Env: RECAPTCHA_PUBLIC_KEY
You will need to generate a keys pair for reCaptcha v2 for your domain from https://www.google.com/recaptcha/admin/create

Ref. to RECAPTCHA_ENABLED

RECAPTCHA_PRIVATE_KEY

Default: geonode_RECAPTCHA_PRIVATE_KEY
Env: RECAPTCHA_PRIVATE_KEY
You will need to generate a keys pair for reCaptcha v2 for your domain from https://www.google.com/recaptcha/admin/create

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).

SEARCH_FILTERS

Default:

```
'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/3.2/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/3.2/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:

SERVICES_TYPE_MODULES

It’s possible to define multiple Service Types Modules for custom service type with its own Handler.

The variable should be declared in this way in settings.py:

```
SERVICES_TYPE_MODULES = [ 'path.to.module1', 'path.to.module2', ... ]
```

Default service types are already included

Inside each module in the list we need to define a variable:

```
'services_type' = {
```
```json
"<key_of_service_type>": { "OWS": True/False, "handler": "<path.to.Handler>", "label": "<label to show in remote service page>", "management_view": "<path.to.view>" }
```

the key_of_service_type is just an identifier to assign at the service type. OWS is True if the service type is an OGC Service Compliant. The handler key must contain the path to the class who will provide all methods to manage the service type The label is what is shown in the service form when adding a new service. The management_view, if exists, must contain the path to the method where the management page is opened.

**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:

```
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:

```
{
    '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.

TASTYPRE_DEFAULT_FORMATS

Default: json
This setting allows you to globally configure the list of allowed serialization formats for your entire site. This is a tastypie setting:

THEME_ACCOUNT_CONTACT_EMAIL

Default: 'admin@example.com'
This email address is added to the bottom of the password reset page in case users have trouble unlocking their account.

THESAURI

Default = []
A list of Keywords thesauri settings: For example THESAURI = [{'name': 'inspire_themes', 'required': True, 'filter': True}, {'name': 'inspire_concepts', 'filter': True}, ]
TOPICCATEGORY_MANDATORY

Default: False
Env: TOPICCATEGORY_MANDATORY

If this option is enabled, Topic Categories will become strictly Mandatory on Metadata Wizard.

TWITTER_CARD

Default:: True

A boolean that specifies whether Twitter cards are enabled.

TWITTER_SITE

Default:: '@GeoNode'

A string that specifies the site to for the twitter:site meta tag for Twitter Cards.

TWITTER_HASHTAGS

Default:: [ 'geonode' ]

A list that specifies the hashtags to use when sharing a resource when clicking on a social link.

TINYMCE_DEFAULT_CONFIG

Default:

```json
{
    "selector": "textarea#id_resource-featureinfo_custom_template",
    "theme": "silver",
    "height": 500,
    "plugins": 'print preview paste importcss searchreplace autolink autosave
    save 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
    fontsizeselect 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}-",
    "autosave_restore_when_empty": "false",
    "autosave_retention": "2m",
}
```

(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 Datasets’ GetFeatureInfo Templates

**UI_REQUIRED_FIELDS**

If this option is enabled, the input selected (we are referring to the one present in the optional Metadata-Tab on the Metadata-Wizard) will become mandatory.

The fields that can be mandatory are:

- id_resource-edition => Label: Edition
- id_resource-purpose => Label: Purpose
- id_resource-supplemental_information => Label: Supplemental information
- id_resource-temporal_extent_start_pickers => Label: temporal extent start
id_resource-temporal_extent_end => Label: temporal extent end
id_resource-maintenance_frequency => Label: Maintenance frequency
id_resource-spatial_representation_type => Label: Spatial representation type

If at least one on the above ids is set in this configuration, the panel header will change from Optional to Mandatory.

Configuration Example:
UI_REQUIRED_FIELDS = ['id_resource-edition']

UNOCONV_ENABLE

Default: False
Env: UNOCONV_ENABLE

UPLOADER

Default:

```python
{
    'BACKEND': 'geonode.importer',
    'OPTIONS': {
        'TIME_ENABLED': False,
    }
}
```

A dictionary of Uploader settings and their values.

- BACKEND
  Default: 'geonode.importer'
  The importer backend requires the GeoServer importer extension to be enabled.

- OPTIONS
  Default:

```python
'OPTIONS': {
    'TIME_ENABLED': False,
}
```

- TIME_ENABLED
  Default: False
  A boolean that specifies whether the upload should allow the user to enable time support when uploading data.
**USER_MESSAGES_ALLOW_MULTIPLE_RECIPIENTS**

Default: True
Env: USER_MESSAGES_ALLOW_MULTIPLE_RECIPIENTS
Set to true to have multiple recipients in /message/create/

**USER_ANALYTICS_ENABLED**

Default: False
Env: USER_ANALYTICS_ENABLED
Set to true to anonymously collect user data for analytics. If true you have to set MONITORING_DATA_AGGREGATION and MONITORING_SKIP_PATHS.

See 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.

**UUID HANDLER**

Is possible to define an own uuidhandler for the Layer.
To start using your own handler, is needed to add the following configuration:

```
LAYER_UUID_HANDLER = "mymodule.myfile.MyObject"
```

The Object must accept as init the instance of the layer and have a method named create_uuid()

here is an example:

```python
class MyObject():
    def __init__(self, instance):
        self.instance = instance

    def create_uuid(self):
        # here your code
        pass
```
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.

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:

   ```sh
   $ 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:

   ```sh
   $ wget https://upload.wikimedia.org/wikipedia/commons/thumb/a/ac/Service_mark.svg/500px-Service_mark.svg.png
   $ wget https://upload.wikimedia.org/wikipedia/commons/thumb/c/c8/Wikimapia_logo_without_label.svg/426px-Wikimapia_logo_without_label.svg.png -O logo.png
   ```

3. Create snippets directory:

   ```sh
   $ cd ../../..
   $ mkdir <my_geonode>/templates/geonode-mapstore-client/snippets
   $ cd <my_geonode>/templates/geonode-mapstore-client/snippets
   ```
4. Create a new HTML file named brand_navbar.html

```
$ sudo vi brand_navbar.html
```

{% extends "geonode-mapstore-client/snippets/brand_navbar.html" %}
{% load static %}
{% block extra_style %}
<style>
  #gn-brand-navbar {
    background: transparent url("/static/img/500px-Service_mark.svg.png") no-repeat;
    background-size: 300px 70px;
    background-position: left center;
    background-position-x: 100px;
  }
</style>
{% endblock %}
{% block logo_src %}
{% static 'img/logo.png' %}
{% endblock %}

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.

![GeoNode](http://example.com)

**Fig. 204: Custom logo**

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/brand_navbar.html` in your editor:

   ```bash
   $ cd <my_geonode>/templates/geonode-mapstore-client/snippets
   $ sudo vi brand_navbar.html
   ```

1. Append a rule to change the background color of the header to match the logo graphic:

   ```html
   #gn-brand-navbar {
      ....
      background-color: #ff0000 !important;
   }
   ```

1. Create new file to manipulate hero section:

   ```bash
   $ cd <my_geonode>/templates/geonode-mapstore-client/snippets
   $ sudo vi hero.html
   ```

1. Add the following code to change the background image and font for the hero section:

   ```html
   {% extends "geonode-mapstore-client/snippets/hero.html" %}
   {% block extra_style %}
   <style>
   #gn-hero {
      background-size: cover;
      background-position: center center;
      background-repeat: no-repeat;
      background-color: rgb(156, 156, 156);
      background-blend-mode: multiply;
      background-size: 100%;
   }
   .msgapi .gn-hero .jumbotron .gn-hero-description h1 {
      font-weight: lighter;
      word-break: break-word;
      font-style: oblique;
      font-family: orbitron;
      font-size: 3.4rem;
   }
   </style>
   {% endblock %}
   ```
1. Collect the static files into STATIC_ROOT, restart the development server and reload the page:

```bash
$ python manage.py collectstatic
$ sudo service apache2 restart
```

![Image](https://via.placeholder.com/150)

**Fig. 205: CSS override**

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.

![Image](https://via.placeholder.com/150)

**Fig. 206: Screenshot of using browser debugger to inspect the CSS overrides**

### Modify GeoNode Homepage

So far we learned how to modify some template sections of your GeoNode main page. You can do it individually per section template, adding a new page under `<my_geonode>/templates/geonode-mapstore-client/snippets` folder with the section name (ex: `brand_navbar.html`) or by extending the base template file `custom_theme.html` where you can add different theme settings in one place.

1. Remove the previous `hero` section `hero.html` file:

```bash
$ rm <my_geonode>/templates/geonode-mapstore-client/snippets/hero.html
```

1. Create a new `custom_theme.html` file:
1. Add the following content to this page:

```html
{% load static %}
{% block content %}
<style>
.msgapi .gn-theme {
    --gn-primary: #df7656;
    --gn-primary-contrast: #e3dcdc;
    --gn-link-color: #fcd823;
    --gn-focus-color: rgba(57, 122, 171, 0.4);
    --gn-footer-bg: #dbb051;
}
#gn-hero {
    background-position: center center;
    background-repeat: no-repeat;
    background-blend-mode: multiply;
    background-size: 100%;
}
.msgapi .gn-hero .jumbotron .gn-hero-description h1 {
    font-weight: bolder;
    word-break: break-word;
    font-style: oblique;
    font-family: orbitron;
    font-size: 3.4rem;
}
.msgapi .gn-hero .jumbotron .gn-hero-description p {
    font-weight: lighter;
    word-break: break-word;
    font-style: oblique;
    font-family: orbitron;
    font-size: 2.2rem;
}
</style>
{% endblock %}
```

1. Restart httpd server

```bash
$ python manage.py collectstatic
$ sudo service apache2 restart
```

1. Your customized layout should be similar to the next picture:

1. Edit title and intro message

1.14. Customize the Look and Feel
Login as administrator on GeoNode and go to **Admin** page:

Create a new theme under *GeoNode Themes Library* and **Themes**:

Add a **Name**, **Description** and turn on **Is enabled** option. At the bottom, add a **Jumbotron title** and **Jumbotron content**. This will override the default GeoNode welcome title and message. Click **Save** at the bottom in the end.
1.15 GeoNode permissions

1.15.1 Permissions

Permissions in GeoNode are set per resource, where a resource can be a dataset, a map, a document, a service or a geoapp. The way the permissions are set is the same for all of them.

**Warning:** GeoNode has a set of default permissions that are applied on resource creation **when** you don’t explicitly declare them. This is particularly relevant when creating and saving a map, where you won’t have the possibility to set the its permissions during the creation phase. GeoNode can be tuned to make sure that by default the new created resource are not public, this can be done by changing two settings, see Default view permissions and Default download permissions.
Single Resource permissions

Resource permissions can be generally set from the resource detail page. The detail page has a menu item *Share* which is visible to people who are permitted to set permissions on a resource.

The share link opens a page on the right with a provision to edit user and group permissions on the resource. see picture below

![Change Dataset Permissions](image)

Fig. 207: *Change Dataset Permissions*

The page for setting the permissions, allows addition of users/groups and selection of a permission to assign each of
You can set the following types of permissions:

- **View**: allows to view the resource;
- **Download**: allows to download the resource;
- **Edit**: allows to change attributes, properties of the datasets features, styles and metadata for the specified resource;
- **Manage**: allows to update, delete, change permissions, publish and unpublish the resource.

**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 dataset 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.

If you have the permissions to set the *Geo Limits*, you should be able to see the permissions section and the globe icon on each user or group.

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

This opens a map dialog, with 3 options at the top:

- The * pencil * icon allows you to draw limits on a map for which a user will be able to see. Click on it to start drawing on the map. Once you are done drawing, click on it again to deactivate drawing mode.
1.15. GeoNode permissions

Fig. 209: Geo Limits Icon

Fig. 210: Geo Limits: Preview Window with Drawing Tools
The icon enables you to remove the limits you have drawn. Click on the limit drawn, and then click the delete icon.

The icon removes all changes that are not saved.

![Fig. 211: Geo Limits: Editing the Geometries](image)

Once you finished editing your geometries, save them into the DB using the Save link in the resource menu. The user with the specified geometries won’t be able from now on to access the whole dataset 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.

### 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:
Fig. 212: *Geo Limits: Geospatial restrictions applies for the user*

![Geo Limits: Geospatial restrictions applies for the user](image)

Fig. 213: *Configuration change in the admin panel*

![Configuration change in the admin panel](image)
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:

- 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 Harvesting resources from remote services

1.17.1 Harvesting resources from remote services

GeoNode is able to harvest resource metadata from multiple remote services.

Harvesting is the process by which a metadata catalogue, i.e. GeoNode, is able to connect to other remote catalogues and retrieve information about their resources. This process is usually performed periodically, in order to keep the local catalogue in sync with the remote.

When appropriately configured, GeoNode will contact the remote service, extract a list of relevant resources that can be harvested and create local resources for each remote resource. It will also keep the resources synchronized with the remote service by periodically updating them.

Out of the box, GeoNode ships with support for harvesting from:

1. Other remote GeoNode instances;
2. OGC WMS servers;
3. **ArcGIS REST services**.

Adding support for *additional harvesting sources* is also possible.

### GeoNode harvesting concepts

When a **harvester** is configured, GeoNode is able to use its corresponding **harvester worker** to contact the remote service and generate a list of **harvestable resources**. The user is then able to select which of those resources are of interest. Depending on its configured update frequency, sometime later, the **harvesting scheduler** will create new **harvesting sessions** in order to create local GeoNode resources from the remote harvestable resources that had been marked as relevant by the user.

The above description uses the following key concepts:

- **harvester** This is the configuration object that is used to parametrize harvesting of a remote service. It is configurable at runtime and is preserved in the GeoNode database.

Harvesters and their properties can be managed by visiting the *Harvesting* -> *Harvesters* section of the GeoNode admin area, or by visiting the api/v2/harvesters/ API endpoint with an admin user.

Among other parameters, a harvester holds:

- **remote_url** Base URL of the remote service being harvested, *e.g.* https://stable.demo.geonode.org
- **harvester_type** Type of harvester worker that will be used to perform harvesting. See the *Harvester worker concept* and the *standard harvester workers* sections below for more detail. Example: geonode.harvesting.harvesters.geonodeharvester.GeonodeUnifiedHarvesterWorker.

- **scheduling_enabled** Whether harvesting shall be performed periodically by the **harvesting scheduler** or not.
- **harvesting_session_update_frequency** How often (in minutes) should new **harvesting sessions** be automatically scheduled?
- **refresh_harvestable_resources_update_frequency** How often (in minutes) should new **refresh sessions** be automatically scheduled?
- **default_owner** Which GeoNode user shall be made the owner of harvested resources
- **harvest_new_resources_by_default** Should new remote resources be harvested automatically? When this option is selected, the user does not need to specify which **harvestable resources** should be harvested, as all of them will be automatically marked for harvesting by GeoNode.
- **delete_orphan_resources_automatically** Orphan resources are those that have previously been created by means of a harvesting operation but that GeoNode can no longer find on the remote service being harvested. Should these resources be deleted from GeoNode automatically? This also applies to when a harvester configuration is deleted, in which case all of the resources that originated from that harvester are now considered to be orphan.

- **harvester worker** Harvester workers implement retrieval for concrete remote service types. Each harvester uses a specific worker, depending on the type of remote service that it gets data from. Harvester workers may accept their own additional configuration parameters.

Harvester workers are set as the **harvester_type** attribute on a **harvester**. Their configuration is set as a JSON object on the **harvester_type_specific_configuration** attribute of the harvester.

GeoNode ships with the following harvester workers:

1. **GeoNode** - Enables harvesting from other GeoNode deployments
2. **WMS** - Enables harvesting from OGC WMS servers
3. **ArcGIS REST services** - Enables harvesting from ArcGIS REST services
Adding new harvester workers is also possible. This allows custom GeoNode deployments to add support for harvesting from other remote sources.

**harvestable resource** A resource that is available on the remote server. Harvestable resources are persisted in the GeoNode DB. They are created during refresh operations, when the harvester worker interacts with the remote service in order to discover which remote resources can be harvested.

Harvestable resources can be managed by visiting the Harvesting -> Harvestable resources section of the GeoNode admin area, or by visiting the api/v2/harvesters/{harvester-id}/harvestable-resources API endpoint with an admin user.

In order to be harvested by the harvesting scheduler, a harvestable resource must have its should_be_harvested attribute set to True. This attribute can be set manually by the user or it can be set automatically by the harvester worker, in case the corresponding harvester is configured with harvest_new_resources_by_default = True.

**harvesting session** In GeoNode, discovering remote resources and harvesting them is always done under the scope of a harvesting session. These sessions are stored in the GeoNode DB and can be inspected by visiting the Harvesting -> Asynchronous harvesting sessions section of the GeoNode admin area.

Harvesting sessions are used to keep track of the progress of execution of the relevant harvesting operations. They are updated while each operation is running. There are two types of sessions:

**refresh session** This session is created during the update of harvestable resources operation. It has type=discover-harvestable-resources. During a refresh session, the harvester worker discovers remote resources and creates their respective harvestable resources on the GeoNode DB. After such session is finished, the user can inspect the found harvestable resources and mark those that are relevant with should_be_harvested=True.

**harvesting session** This session is created during the perform harvesting operation. It has type=harvesting. During a harvesting session, the harvester worker creates or updates new GeoNode resources based on the harvestable resources that have been configured with should_be_harvested=True.

In addition to the aforementioned type, harvesting sessions also carry the status attribute, which provides context on the current status of the session (and consequently of the underlying harvesting operation).

**harvesting scheduler** The scheduler is responsible for initiating new harvesting operations in an automated fashion. Periodically, the scheduler goes through the list of existing harvesters, checking if it is time to dispatch one of the harvesting operations mentioned in the next section.

The scheduler's operation frequency is configurable by defining a HARVESTER_SCHEDULER_FREQUENCY_MINUTES setting - the default is to trigger the scheduler every 30 seconds.

**Note:** Since the harvesting scheduler only checks if there is work to do once every x seconds (defaulting to 30 seconds, as mentioned above), there will usually be a delay between the time a harvesting operation is supposed to be scheduled and the actual time when it is indeed scheduled. Moreover, the harvesting scheduler is implemented as a celery task. This means that, if the celery worker is busy, that may also cause a delay in scheduling harvesting operations, as the scheduler’s celery task may not be triggered immediately.
Harvesting workflows

There are two main possible harvesting workflows:

1. **Continuous harvesting**
2. **One-time harvesting**

### Continuous harvesting

This workflow relies on the harvesting scheduler in order to ensure harvested resources are continuously kept up to date with their remote counterparts.

1. User creates harvester and sets its `scheduling_enabled` attribute to `True`;
2. When the time comes, the harvesting scheduler calls the `update list of harvestable resources operation`. Alternatively, the user may call this operation manually the first time.
3. When the previous operation is done, user goes through the list of generated harvestable resources and, for each relevant harvestable resource, sets it `should_be_harvested` attribute to `True`. Alternatively, if the harvester has its `harvest_new_resources_automatically` attribute set to `True`, the harvestable resources will already be marked as to be harvested, without requiring manual user intervention;
4. When the time comes, the harvesting scheduler calls the `perform harvesting operation`. This causes the remote resources to be harvested. These now show up as resources on the local GeoNode.

### One-time harvesting

This workflow is mostly executed manually by the user.

1. User creates harvester and sets its `scheduling_enabled` attribute to `False`;
2. User calls the `update list of harvestable resources operation`;
3. When the previous operation is done, user goes through the list of generated harvestable resources and, for each relevant harvestable resource, sets it `should_be_harvested` attribute to `True`;
4. User then proceeds to call the `perform harvesting operation`. This causes the remote resources to be harvested. These now show up as resources on the local GeoNode.

### Harvester operations

Each GeoNode harvester is able to perform a finite set of operations. These can be performed either:

1. In an **automated fashion**, being dispatched by the harvesting scheduler. Automated harvesting is only performed when the corresponding harvester has `scheduling_enabled=True`;
2. **On-demand**, by explicit request of the user. On-demand execution can be requested by one of two ways:
   1. By selecting the relevant harvester(s) in the Harvesting -> Harvesters section of the GeoNode admin area and then selecting and running an action from the drop-down menu;
   2. By interacting with the GeoNode REST API. Harvester actions are requested by issuing HTTP PATCH requests to the `/api/v2/harvesters/{harvester-id}/` endpoint. The payload of such requests must specify the corresponding status. For example, by issuing a request like:
We are asking that the harvester’s status be changed to updating-harvestable-resources. If the server accepts this request, then the update list of harvestable resources operation is triggered.

Note: The server will not accept the API request if the harvester’s current status is not ready.

While performing an action, the harvester’s status property transitions from ready to whatever action-related status is appropriate (as indicated below). As the operation finishes execution, the harvester’s status transitions back to ready. If the harvester has any status other than ready, then it is currently busy. When a harvester is busy it cannot execute other operations, you’ll need to wait until the current operation finishes.

Check if the remote service is available operation

This operation causes the harvester to perform a simple health check on the remote service, in order to check whether it responds successfully. The response is stored in the harvester’s remote_available property. This operation is performed in the same process of the main GeoNode (i.e. it runs synchronously).

When triggered, this operation causes the harvester’s status to transition to checking-availability. As the operation finishes, the harvester’s status transitions back to ready.

Invocation via the GeoNode admin is performed by selecting the Check availability of selected harvesters command.

Invocation via the GeoNode REST API is performed by issuing an HTTP PATCH request with a payload that sets the harvester status.

Update the list of harvestable resources operation

This operation causes the harvester to interact with the remote service in order to discover which resources are available for being harvested. Existing remote resources are then saved as harvestable resources.

Since this operation can potentially take a long time to complete (as we don’t know how many resources may exist on the remote service), it is run using a background process. GeoNode creates a new refresh session and uses it to track the progress of this operation.

When triggered, this operation causes the harvester’s status to transition to updating-harvestable-resources. As the operation finishes, the harvester’s status transitions back to ready.

Invocation via the GeoNode admin is performed by selecting the Update harvestable resources for selected harvesters command.

Invocation via the GeoNode REST API is performed by issuing an HTTP PATCH request with a payload that sets the harvester status.
Perform harvesting operation

This operation causes the harvester to check which harvestable resources are currently marked as being harvestable and then, for each one, harvest the resource from the remote server.

Since this operation can potentially take a long time to complete (as we don’t know how may resources may exist on the remote service), it is run using a background process. GeoNode creates a new harvesting session and uses it to track the progress of this operation.

When triggered, this operation causes the harvester’s status to transition to harvesting-resources. As the operation finishes, the harvester’s status transitions back to ready.

Invocation via the GeoNode admin is performed by selecting the Perform harvesting on selected harvesters command.

Invocation via the GeoNode REST API is performed by issuing an HTTP PATCH request with a payload that sets the harvester status.

Abort update of harvestable resources operation

This operation causes the harvester to abort an on-going update list of harvestable resources operation.

When triggered, this operation causes the harvester’s status to transition to aborting-update-harvestable-resources. As the operation finishes, the harvester’s status transitions back to ready.

Invocation via the GeoNode admin is performed by selecting the Abort on-going update of harvestable resources for selected harvesters command.

Invocation via the GeoNode REST API is performed by issuing an HTTP PATCH request with a payload that sets the harvester status.

Abort harvesting operation

This operation causes the harvester to abort an on-going perform harvesting operation.

When triggered, this operation causes the harvester’s status to transition to aborting-performing-harvesting. As the operation finishes, the harvester’s status transitions back to ready.

Invocation via the GeoNode admin is performed by selecting the Abort on-going harvesting sessions for selected harvesters command.

Invocation via the GeoNode REST API is performed by issuing an HTTP PATCH request with a payload that sets the harvester status.

Reset harvester operation

This operation causes the harvester’s status to be reset back to ready. It is mainly useful for troubleshooting potential errors, in order to unlock harvesters that may get stuck in a non-actionable status when some unforeseen error occurs.

When triggered, this operation causes the harvester’s status to transition to ready immediately.

Invocation via the GeoNode admin is performed by selecting the Reset harvester status command.

This operation cannot be called via the GeoNode API.
Standard harvester workers

**Note:** Remember that, as stated above, a harvester worker is configured by means of setting the `harvester_type` and `harvester_type_specific_configuration` attributes on the `harvester`.

Moreover, the format of the `harvester_type_specific_configuration` attribute must be a JSON object.

**GeoNode harvester worker**

This worker is able to harvest remote GeoNode deployments. In addition to creating local resources by retrieving the remote metadata, this harvester is also able to copy remote datasets over to the local GeoNode. This means that this harvester can even be used in order to generate replicated GeoNode instances.

This harvester can be used by setting `harvester_type=geonode.harvesting.harvesters.geonodeharvester.GeonodeUnifiedHarvesterWorker` in the harvester configuration.

It recognizes the following `harvester_type_specific_configuration` parameters:

- **harvest_datasets** Whether to harvest remote resources of type dataset or not. Acceptable values: `true` (the default) or `false`.
- **copy_datasets** Whether to copy remote resources of type dataset over to the local GeoNode. Acceptable values: `true` or `false` (the default).
- **harvest_documents** Whether to harvest remote resources of type document or not. Acceptable values: `true` (the default) or `false`.
- **copy_documents** Whether to copy remote resources of type document over to the local GeoNode. Acceptable values: `true` or `false` (the default).
- **resource_title_filter** A string that must be present in the remote resources’ title in order for them to be acknowledged as harvestable resources. This allows filtering out resources that are not relevant. Acceptable values: any alphanumeric value.

  Example: setting this to a value of "water" would mean that the harvester would generate harvestable resources for remote resources that are titled water basins, Water territories, etc. The harvester would not generate harvestable resources for remote resources whose title does not contain the word water.

- **start_date_filter** A string specifying a datetime that is used to filter out resources by their start date. This is parsed with `dateutil.parser.parse()`, which means that it accepts many different formats (e.g. `2021-06-31T13:04:05Z`).

- **end_date_filter** Similar to `start_date_filter` but uses resources’ end date as a filter parameter.
- **keywords_filter** A list of keywords that are used to filter remote resources.
- **categories_filter** A list of categories that are used to filter remote resources.
WMS harvester worker

This worker is able to harvest from remote OGC WMS servers.

This harvester can be used by setting `harvester_type=geonode.harvesting.harvesters.wms.OgcWmsHarvester` in the harvester configuration.

It recognizes the following `harvester_type_specific_configuration` parameters:

- **dataset_title_filter**: A string that is used to filter remote WMS layers by their title property. If a remote layer’s title contains the string defined by this parameter, then the layer is recognized by the harvester worker.

ArcGIS REST Services harvester worker

This worker is able to harvest from remote ArcGIS REST Services catalogs.

This worker is able to recognize two types of `remote_url`:

1. URL of the ArcGIS REST services catalog. This URL usually ends in `rest/services`. A catalog may expose several different services. This harvester worker is able to descend into the available ArcGIS Rest services and retrieve their respective resources. Example:
   
   ```plaintext
   https://sampleserver6.arcgisonline.com/arcgis/rest/services
   ```

2. URL of the ArcGIS REST services Service. This URL usually takes the form `{base-url}/rest/services/{service-name}/{service-type}`. Example:
   
   ```plaintext
   ```

This harvester worker can be used by setting `harvester_type=geonode.harvesting.harvesters.arcgis.ArcgisHarvesterWorker` in the harvester configuration.

It recognizes the following `harvester_type_specific_configuration` parameters:

- **harvest_map_services**: Whether services of type `MapServer` ought to be harvested. Defaults to True.
- **harvest_image_services**: Whether services of type `ImageServer` ought to be harvested. Defaults to True.
- **resource_name_filter**: A string that is used to filter remote WMS layers by their title property. If a remote layer’s name contains the string defined by this parameter, then the layer is recognized by the harvester worker.
- **service_names_filter**: A list of names that are used to filter the remote ArcGIS catalog.

Creating new harvesting workers

New harvesting workers can be created by writing classes derived from `geonode.harvesting.harvesters.base.BaseGeonodeHarvesterWorker`. This class defines an abstract interface that must be implemented. All methods decorated with `abc.abstractmethod` must be implemented in the custom harvester worker class. Study the implementation of the standard GeoNode harvester worker classes in order to gain insight on how to implement custom ones.

After writing a custom harvester worker class, it can be added to the list of known harvester workers by defining the `HARVESTER_CLASSES` GeoNode setting. This setting is a list of strings, containing the Python class path to each harvester worker class. It has a default value of:
These are the standard harvester worker classes shipped by GeoNode. If this setting is defined, its value will simply extend the default list. This means that it is not possible to disable the standard worker classes, only to add new ones.

### 1.18 Monitoring

#### 1.18.1 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 its 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 Potgresql 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.getenv("MONITORING_DATA_TTL", 7))))
  # this will disable csrf check for notification config views,
  ```

(continues on next page)
# 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),),
)

# privacy settings
USER_ANALYTICS_ENABLED = ast.literal_eval(os.getenv('USER_ANALYTICS_ENABLED', 'False'))

• run

```bash
DJANGO_SETTINGS_MODULE=<project_name>.settings python manage.py migrate --monitoring
```
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):

```
DJANGO_SETTINGS_MODULE=<project_name>.settings python manage.py collect_metrics -n -t xml
```

cront job

```
sudo crontab -e

# Add the following line at the bottom; this will run the supervisor command every minute
* * * * * supervisorctl start geonode-monitoring
```

supervisor

```
sudo apt install supervisor
sudo service supervisor restart
sudo update-rc.d supervisor enable

sudo vim /etc/supervisor/conf.d/geonode-monitoring.conf

[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
```
**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:

   ![GeoNode Welcome Screen](image)

2. Go to monitoring section (or type `/admin/monitoring/` as a path in URL):
<table>
<thead>
<tr>
<th>Layers</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributes</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Layers</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Styles</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Upload sessions</td>
<td>Add</td>
<td>Change</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maps</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Map layers</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Map snapshots</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Maps</td>
<td>Add</td>
<td>Change</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exception events</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Hosts</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Metric labels</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Metric notification checks</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Metrics</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Monitored resources</td>
<td>Add</td>
<td>Change</td>
</tr>
</tbody>
</table>

3. Go to Hosts:
4. Click on **Add host +**:

5. Enter following information: *host: localhost* *ip: 127.0.0.1* Note, that **host** value is arbitrary. You can enter other name if you like. Don’t forget to save.

6. Go to **Services**:
7. Click on Add service +:

8. Enter following information:
   - name: local-geonode
   - host: localhost
   - service type: geonode
9. Add another **Service** Enter following information:

- **name**: `local-system-geonode`
- **host**: `localhost`
- **service type**: `hostgeonode`
- **url**: `http://localhost/` (should point to GeoNode home page)
10. Add another **Service** and enter following information:

- **name:** `local-geoserver`
- **host:** `localhost`
- **service type:** `geoserver`
- **url:** `http://localhost/geoserver/` (should point to GeoServer home page)
To summarize, following entries should be created in admin/monitoring:

- **Host**: localhost, with ip: 127.0.0.1

- **Service**: local-geonode:
  - host localhost
  - type geonode

- **Service**: local-geoserver:
  - url http://localhost/geoserver/
  - host localhost
  - type geoserver

- **Service**: local-system-geonode
  - url http://localhost/
  - host localhost
  - type hostgeonode
Usage

Monitoring interface is available for superusers only. It’s available in profile menu:

Dashboard

Main view offers overview of recent situation in GeoNode deployment.
Top bar and indicators

With top bar buttons User can:

- go back from nested interface elements (charts, alerts, errors)
- select time window from which data will be aggregated and shown (last 10 minutes, last 1 hour, last day or last week from now)
- see what’s currently used time window
- enable/disable autorefresh

Below there are four main health indicators:

- **aggregated Health Check information.** This element will be:
  - green if there is no alerts nor errors
  - yellow if there are alerts
  - red if there are errors

- **Uptime** that shows GeoNode’s system uptime.

- **Alerts** shows number of notifications from defined checks. When clicked, Alerts box will show detailed information. See Notifications description for details.

- **Errors** - shows how many errors were captured during request processing. When clicked, Errors box will show detailed list of captured errors. See Errors description for details.

Indicators in error state

Software Performance

Software Performance view shows GeoServer web service statistics, for all requests monitored and detailed, OWS-specific, per service type (WMS, WFS, OCS etc).

1.18. Monitoring
1.18. Monitoring

Clicking on will show charts with data history for overall performance and per-OWS performance:

**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
Hartware Performance

Hardware performance box shows hardware usage statistics for selected host (monitored with any of hostgeonode or hostgeoserver type Service): % of CPU usage and average memory consumption. User can select from which host data will be presented.
Clicking on `Hardware Performance` will show charts with data history for selected host and time period.
Errors view will show list of captured errors in GeoNode and GeoServer. List contents is displayed for selected time window.

For each error, details are available:

- error class, message and stack trace
- basic request context (IP, path, user agent)
Alerts

An alert is a descriptive information on situation when observed metric contains values outside allowed range (for example, response time is above 30 seconds, or no requests were served within last 30 minutes). Alerts are generated by notifications mechanism described below.

Alerts view will show list of alerts for current moment (alerts that were generated in past are not displayed here):

Each alert contains more descriptive information what is wrong:
Notifications

Notification mechanism (not to be confused with notifications application in GeoNode) is a way to inform selected users about situations, where collected metric data would indicate a problem with deployment. Notifications are accessible from Alerts view:

There can be several notification configurations available.

Each notification configuration contains two main elements:

- list of email 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.

1.18.2 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"
        }
    ]
}
```
Resource is described with following attributes:

- **id** - numeric id of resource record in monitoring
- **type** - type of resource
- **name** - name of resource.

Resources list can be filtered with following query string arguments:

- **metric_name** - name of metric for which resources should be returned
- **resource_type** - name of type of resource (layer, map, document, style, url)
- **valid_from** - list resources that are available since that timestamp
- **valid_to** - list resources that are available until that timestamp

Example:

```
GET /monitoring/api/resources/?resource_type=layer&metric_name=request_count&valid_from=2017-08-01
```

```
{
  "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:island"
    }
  ]
}
```
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/

```json
{
    "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",
```
Event Types

Event Types describe the way resources were used in GeoNode. Resource can be accessed as a regular view (through GeoNode, like /layers/X url), or through OWS request. Full list of Event Types handled is available in /api/event_types/ endpoint:

GET /monitoring/api/event_types/

```json
{
    "status": "ok",
    "errors": { },
    "data": {
        "key": "event_types"
    },
    "event_types": [
        {
            "name": "all"
        },
        {
            "name": "other"
        },
        {
            "name": "download"
        },
        {
            "name": "view"
        },
        {
            "name": "OWS:TMS"
        },
        {
            "name": "OWS:WMS-C"
        }
    ]
}
```
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
  ```
GeoNode Documentation, Release 3.2.1

```
{
  "status": "ok",
  "errors": {},
  "data": {
    "key": "event_types"
  },
  "event_types": [
    {
      "name": "OWS:TMS",
      "type_label": "TMS"
    },
    {
      "name": "OWS:WMS-C",
      "type_label": "WMS-C"
    },
    {
      "name": "OWS:WMTS",
      "type_label": "WMTS"
    },
    {
      "name": "OWS:WCS",
      "type_label": "WCS"
    },
    {
      "name": "OWS:WFS",
      "type_label": "WFS"
    },
    {
      "name": "OWS:WMS",
      "type_label": "WMS"
    },
    {
      "name": "OWS:WPS",
      "type_label": "WPS"
    },
    {
      "name": "OWS:ALL",
      "type_label": "Any OWS"
    }
  ],
  "success": true
}
```

- **non-OWS** event types

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

```json
{
  "status": "ok",
  "errors": {},
  "data": {
    "key": "event_types"
  },
  "success": true
}
```

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"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"
  },
  {
    "name": "download",
    "type_label": "Download"
  },
  {
    "name": "publish",
    "type_label": "Publish"
  },
  {
    "name": "remove",
    "type_label": "Remove"
  },
  {
    "name": "geoserver",
    "type_label": "Geoserver event"
  }
],
"success": true
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"
    },
    {
      "id": 298,
      "name": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_5) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.115 Safari/537.36"
    },
    {
      "id": 261,
      "name": "lo"
    },
    {
      "id": 331,
      "name": "PUT"
    },
    {
      "id": 334,
      "name": "Other / Other / Python Requests 2.18"
    }
  ]
}
```

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

```json
{
    "labels": [
        {
            "id": 298,
            "name": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_5) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.115 Safari/537.36"
        },
        {
            "id": 312,
            "name": "Java/1.8.0_131"
        },
        {
            "id": 293,
            "name": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/36.0.1985.67 Safari/537.36"
        },
        {
            "id": 345,
            "name": "Mozilla/5.0 (Macintosh; Intel Mac OS X) AppleWebKit/538.1 (KHTML, like Gecko) PhantomJS/2.1.1 Safari/538.1"
        },
        ...
    ]
}
```

**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/

```json
{
    "metrics": [
        {
            "metrics": [
                {
                    "type": "count",
                    "name": "request.count",
                    "unit": "Count"
                },
```
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)

```bash
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
```
```json
{
    "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 Gecko/Firefox/53.0",
                        "metric_count": 10
                    },
                    {
                        "samples_count": 790,
                        "val": "790.0000",
                        "min": "19.0000",
                        "max": "79.0000",
                        "sum": "790.0000",
                        "label": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.78 Safari/537.36",
                        "metric_count": 22
                    },
                    {
                        "samples_count": 150,
                        "val": "150.0000",
                        "min": "15.0000",
                        "max": "15.0000",
                        "sum": "150.0000",
                        "label": "Mozilla/5.0 (Macintosh; Intel Mac OS X) AppleWebKit/538.1 (KHTML, like Gecko) PhantomJS/2.1.1 Safari/538.1",
                        "metric_count": 10
                    }
                ],
                "valid_to": "2017-08-03T12:00:00"
            },
            {
                "valid_from": "2017-08-03T12:00:00",
                "data": [],
                "valid_to": "2017-08-03T13:00:00"
            },
            {
                "valid_from": "2017-08-03T13:00:00",
                "data": [
                    {
                        "samples_count": 790,
                        "val": "790.0000",
                        "min": "19.0000",
                        "max": "79.0000",
                        "sum": "790.0000",
                        "label": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.78 Safari/537.36",
                        "metric_count": 22
                    },
                    {
                        "samples_count": 150,
                        "val": "150.0000",
                        "min": "15.0000",
                        "max": "15.0000",
                        "sum": "150.0000",
                        "label": "Mozilla/5.0 (Macintosh; Intel Mac OS X) AppleWebKit/538.1 (KHTML, like Gecko) PhantomJS/2.1.1 Safari/538.1",
                        "metric_count": 10
                    }
                ],
                "valid_to": "2017-08-03T14:00:00"
            }
        ]
    }
}
```
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": [
    ...
  ]
}
```

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
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
```

```json
{
  "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
        },
        {
          "resource": {
            "type": "layer",
            "name": "sde:HYP_HR_SR_OB_DR"
          },
          "samples_count": 72,
```
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"val": "72.0000",
"min": "24.0000",
"max": "24.0000",
"sum": "72.0000",
"label": "count",
"metric_count": 3,
"id": 25
]
,"valid_to": "2017-09-05T00:00:00"
}
]
,"valid_to": "2017-09-09T00:00:00"
}
,"metric": "request.count",
"interval": 86400,
"type": "count",
"axis_label": "Count",
"label": null
}
}

- **resource_no_labels** - group by resource affected, but do not distinct by label. This will produce similar result as the other grouping, but it will not contain ‘label’ key.

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

{  
"data": {
  "input_valid_from": "2018-07-10T15:13:50.784Z",
  "input_valid_to": "2018-07-11T15:13:50.784Z",
  "data": [
  
  ]
}
,"val": "2018-07-10T15:13:50.784Z",
,"data": [
  
  ]
,"resource": {
  "type": "url",
  "name": "/layers/",
  "id": 15
},
,"metric_count": 4,
,"val": 2,
,"min": "1.0000",
,"max": "1.0000",
,"sum": "4.0000",
,"samples_count": 4
},
,"resource": {
  "type": "url",
  "name": "/",
}
"id": 16,
},
"metric_count": 4,
"val": 2,
"min": "1.0000",
"max": "4.0000",
"sum": "7.0000",
"samples_count": 7
},
{
"resource": {
"type": "url",
"name": "/maps/",
"id": 17
},
"metric_count": 4,
"val": 2,
"min": "1.0000",
"max": "2.0000",
"sum": "5.0000",
"samples_count": 5
},
{
"resource": {
"type": "url",
"name": "/maps/3",
"id": 18
},
"metric_count": 1,
"val": 1,
"min": "1.0000",
"max": "1.0000",
"sum": "1.0000",
"samples_count": 1
},
{
"resource": {
"type": "url",
"name": "/maps/7",
"id": 20
},
"metric_count": 1,
"val": 1,
"min": "1.0000",
"max": "1.0000",
"sum": "1.0000",
"samples_count": 1
}
],
"valid_to": "2018-07-11T15:13:50.784Z"
}
- **label** - group by label. This will return number of unique label occurrences within selected period.

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

```json
{
    "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/

```json
{
    "exceptions": [
        {
            "url": "/monitoring/api/exceptions/8/",
            "error_type": "exceptions.ValueError",
            "id": 8,
            "service": {
                "type": "geonode",
                "name": "local-geonode"
            },
            "created": "2017-06-20T17:50:24.922"
        },
        {
            "url": "/monitoring/api/exceptions/9/",
            "error_type": "org.geoserver.platform.ServiceException",
            "id": 9,
            "service": {
                "type": "geoserver",
                "name": "local-geoserver"
            },
            "created": "2017-06-26T15:33:20.152"
        },
        {
            "url": "/monitoring/api/exceptions/10/",
            "error_type": "org.geoserver.platform.ServiceException",
            "id": 10,
            "service": {
                "type": "geoserver",
                "name": "local-geoserver"
            },
            "created": "2017-06-26T15:33:20.152"
        }
    ]
}
```
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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/

```
{
    "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 = 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/__init__.py", line 251, in dumps
    sort_keys=sort_keys,**kw).encode(obj)
    File "/usr/lib64/python2.7/json/encoder.py", line 207, in encode
    return _iterencode(o, 0)
    File "/usr/lib64/python2.7/json/encoder.py", line 115, in default
    return super(DjangoJSONEncoder, self).default(o)
    File "/usr/lib64/python2.7/json/encoder.py", line 184, in default
    raise TypeError(repr(o) + " is not JSON serializable")
  TypeError: <Service: Service: local-geoserver@localhost> is not JSON serializable
",
}
```
"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",
  "created": "2017-07-24T13:29:28.280"
},
"response": {
  "status": 200,
  "time": 30,
  "type": "text/html; charset=utf-8",
  "size": 0
},
"resources": [],
"error_message": "exceptions.TypeError"
}

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": {}
}
```

1.18.3 Monitoring: User Analytics

Purpose

UA should provide information about GeoNode resources usage at user level (not request level, like plain monitoring).

Requests

1. total number of unique sessions on GeoNode (excluding ows requests) per day. This gives a base view of the reach.
   - requests from all sessions of all types, ows and non-ows
     
     ```
     GET /monitoring/api/metric_data/request.users/?last=(x*86400)&interval=86400&group_by=label
     ```
     
   - non-ows related
     
     ```
     GET /monitoring/api/metric_data/request.users/?last=(x*86400)&interval=86400&group_by=label&event_type=other
     ```
     
   - only ows related
     
     ```
     GET /monitoring/api/metric_data/request.users/?last=(x*86400)&interval=86400&group_by=label&event_type=OWS:ALL
     ```
     
```json
{
    "data": {
        "input_valid_from": "2018-07-11T15:41:06.419Z",
        "input_valid_to": "2018-07-12T15:41:06.419Z",
        "data": [
            {
                "valid_from": "2018-07-11T15:41:06.419Z",
                "data": [
                    {
                        "samples_count": 82,
                        "val": 9,
                        "min": "0.0000",
                        "max": "24.0000",
                        "sum": "82.0000",
                        "metric_count": 16
                    }
                ],
                "valid_to": "2018-07-12T15:41:06.419Z"
            }
        ]
    }
}
```
2. total number of unique sessions per URL (excluding ows requests). Let me see how many users visits the layers page or the maps page

- get number of unique tracking ids for urls

GET /monitoring/api/metric_data/request.users/?last=(x*86400)&interval=86400&group_by=resource_on_label&resource_type=url&event_type=other

```json
{
    "data": {
        "input_valid_from": "2018-07-11T15:39:25.126Z",
        "input_valid_to": "2018-07-12T15:39:25.126Z",
        "data": [
            {
                "valid_from": "2018-07-11T15:39:25.126Z",
                "data": [
                    {
                        "resource": {
                            "type": "url",
                            "name": "/layers/",
                            "id": 15
                        },
                        "metric_count": 2,
                        "val": 2,
                        "min": "1.0000",
                        "max": "1.0000",
                        "sum": "2.0000",
                        "samples_count": 2
                    },
                    {
                        "resource": {
                            "type": "url",
                            "name": "/",
                            "id": 16
                        },
                        "metric_count": 2,
                        "val": 2,
                        "min": "1.0000",
                        "max": "1.0000",
                        "sum": "2.0000",
                        "samples_count": 2
                    }
                ]
            }
        ]
    }
}
```

(continues on next page)
3. total number of unique sessions per event_type: for example total number of unique visits of resource pages (independently by resource type and id)

- to get number of requests

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

- to get number of unique tracking ids

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

- to get number of unique tracking ids for each event_type on a given resource type

GET /monitoring/api/metric_data/request.users/?last=86400&interval=86400&group_by=event_type_on_label&resource_type=url
GeoNode Documentation, Release 3.2.1

• to get number of unique users for each event type on specific resource type

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

```json
{
    "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": "view",
    "val": 2,
    "min": "1.0000",
    "max": "1.0000",
    "sum": "5.0000",
    "metric_count": 5
},
"valid_to": "2018-07-12T17:54:41.467Z"
}
```

(continued on next page)
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_on_label
"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",
"sum": "2.0000",
"samples_count": 2
},
{
"resource": {
"type": "url",
"name": "/",
"id": 16
}.
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=315360000&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": "1.0000",
            "sum": "5.0000",
            "metric_count": 5
          }
        ],
        "valid_to": "2020-01-01T00:00:00Z"
      },
      "metric": "request.users",
      "interval": 31536000,
      "type": "value",
      "axis_label": "Count",
      "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

```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": "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
          }
        ]
      }
    ]
  }
}
```
• 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

```
{
  "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": 2,
            "val": 1,
            "min": "2.0000",
            "max": "2.0000",
            "sum": "2.0000",
            "user": "admin",
            "metric_count": 1
          },
          {
            "samples_count": 1,
            "val": 1,
            "min": "1.0000",
            "max": "1.0000",
            "sum": "1.0000",
            "user": "user1_username",
            "metric_count": 1
          }
        ]
      },
      "valid_to": "2020-01-01T00:00:00Z"
    ]
  },
  "metric": "request.users",
  "interval": 31536000,
  "type": "value",
  "axis_label": "Count",
  "label": null
}
```
8. total number of unique users for each monitored resource.

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": "",  
          "type": "layer",  
          "name": "geonode:railways",  
          "id": 4  
      },  
      "metric_count": 5,  
      "val": 2,  
      "max": "",  
      "sum": "",  
      "min": "",  
      "samples_count": 5  
      }  
    ]  
  ]  
}

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"max": "2.0000",
"sum": "3.0000",
"min": "0.0000",
"samples_count": 3
},
{
"resource": {
"href": "/layers/",
"type": "url",
"name": "/layers/",
"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": "/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": "/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": "/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": "/documents/2",
"type": "document",
"name": "test_doc_1.txt",
"id": 5
},
"metric_count": 2,
9. total number of resource monitored in a given time range.

GET /monitoring/api/metric_data/request.users/?last=31536000&interval=31536000&group_by=count_on_resource

{
  "data": {
    "input_valid_from": "2018-09-10T14:20:27.335Z",
    "input_valid_to": "2019-09-10T14:20:27.335Z",
    "data": [
      {
        "valid_from": "2018-09-10T14:20:27.335Z",
        "data": [
          {
            "samples_count": 52,
            "val": 7,
            "min": "0.0000",
            "max": "2.0000",
            "sum": "52.0000",
            "metric_count": 53
          }
        ],
        "valid_to": "2019-09-10T14:20:27.335Z"
      }
    ],
    "metric": "request.users",
    "interval": 31536000,
    "type": "value",
    "axis_label": "Count",
    "label": null
  }
}
1.18.4 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.
1.18.5 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": [
        {
            "problems": [
                {
                    "threshold_value": "2017-08-29T10:45:26.142",
                    "message": "Value collected too far in the past",
                    "name": "request.count",
                    "severity": "warning",
                    "offending_value": "2017-08-25T16:41:00"
                }
            ],
            "check": {
                "grace_period": {
                    "seconds": 600,
                    "class": "datetime.timedelta"
                },
                "last_send": null,
                "description": "detects when requests are not handled",
                "severity": "warning",
                "user_threshold": {
                    "3": {
                        "max": 10,
                        "metric": "request.count",
                        "steps": null,
                        "description": "Number of handled requests is lower than",
                        "min": 0
                    }
                },
                "4": {
                    "max": null,
                    "metric": "request.count",
                    "steps": null
                }
            }
        }
    ]
}
```

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"description": "No response for at least",
"min": 60
},
"5": {
  "max": null,
  "metric": "response.time",
  "steps": null,
  "description": "Response time is higher than",
  "min": 500
}
},
"id": 2,
"name": "geonode is not working"
],
"success": true
}

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/

```json
{
  "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"
      }
    ]
  }
}
```

(continues on next page)
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}}/

```json
{
    "status": "ok",
    "errors": {},
    "data": {
        "fields": [
            {
                "is_enabled": true,
                "use_resource": false,
                "description": "Number of handled requests is lower than",
                "max_value": "10.0000",
                "metric": {
                    "class": "geonode.contrib.monitoring.models.Metric",
                    "name": "request.count",
                    "id": 2
                },
                "min_value": "0.0000",
                "use_label": false,
                "use_ows_service": false,
                "field_option": "min_value",
                "use_service": false,
                "steps_calculated": [
                    "0.0000",
                    "3.33",
                    "6.67",
                    "10.0"
                ],
                "current_value": "30.0000"
            }
```
"steps": 3,
"notification_check": {
   "class": "geonode.contrib.monitoring.models.NotificationCheck",
   "name": "geonode is not working",
   "id": 2
},
"field_name": "request.count.min_value",
"id": 3,
"unit": ""
},
{
   "is_enabled": true,
   "use_resource": false,
   "description": "No response for at least",
   "max_value": null,
   "metric": {
      "class": "geonode.contrib.monitoring.models.Metric",
      "name": "request.count",
      "id": 2
   },
   "min_value": "60.0000",
   "use_label": false,
   "use_ows_service": false,
   "field_option": "max_timeout",
   "use_service": false,
   "steps_calculated": null,
   "current_value": {
      "seconds": 120,
      "class": "datetime.timedelta"
   },
   "steps": null,
   "notification_check": {
      "class": "geonode.contrib.monitoring.models.NotificationCheck",
      "name": "geonode is not working",
      "id": 2
   },
   "field_name": "request.count.max_timeout",
   "id": 4,
   "unit": ""
},
{
   "is_enabled": false,
   "use_resource": false,
   "description": "Response time is higher than",
   "max_value": null,
   "metric": {
      "class": "geonode.contrib.monitoring.models.Metric",
      "name": "response.time",
      "id": 11
   },
   "min_value": "500.0000",
   "use_label": false,
"use_ows_service": false,
"field_option": "max_value",
"use_service": false,
"steps_calculated": null,
"current_value": null,
"steps": null,
"notification_check": {
    "class": "geonode.contrib.monitoring.models.NotificationCheck",
    "name": "geonode is not working",
    "id": 2
},
"field_name": "response.time.max_value",
"id": 5,
"unit": "s"
},
{
    "is_enabled": false,
    "use_resource": false,
    "description": "dsfdfs",
    "max_value": null,
    "metric": {
        "class": "geonode.contrib.monitoring.models.Metric",
        "name": "response.time",
        "id": 11
    },
    "min_value": null,
    "use_label": false,
    "use_ows_service": false,
    "field_option": "min_value",
    "use_service": false,
    "steps_calculated": null,
    "current_value": null,
    "steps": null,
    "notification_check": {
        "class": "geonode.contrib.monitoring.models.NotificationCheck",
        "name": "geonode is not working",
        "id": 2
    },
    "field_name": "response.time.min_value",
    "id": 6,
    "unit": "s"
},
{
    "is_enabled": true,
    "use_resource": false,
    "description": "Incoming traffic should be higher than",
    "max_value": null,
    "metric": {
        "class": "geonode.contrib.monitoring.models.Metric",
        "name": "network.in.rate",
        "id": 34
    }
}
"min_value": null,
"use_label": false,
"use_ows_service": false,
"field_option": "min_value",
"use_service": false,
"steps_calculated": null,
"current_value": "1000000.0000",
"steps": null,
"notification_check": {
  "class": "geonode.contrib.monitoring.models.NotificationCheck",
  "name": "geonode is not working",
  "id": 2
},
"field_name": "network.in.rate.min_value",
"id": 7,
"unit": "B/s"
}

"form": "<tr><th><label for="id_emails">Emails:</label></th><td><textarea cols="40" id="id_emails" name="emails" rows="10">
  ad@m.in</textarea></td></tr>
<tr><th><label for="id_severity">Severity:</label></th><td><select id="id_severity" name="severity">
<option value="warning">Warning</option>
<option value="error" selected="selected">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_response.time.max_value">Response.time.max value:</label></th><td><input id="id_response.time.max_value" name="response.time.max_value" min="500.0000" type="number" step="0.01" value="" /></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" value="" /></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" value="" /></td></tr>


"notification": {
  "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": {
      "class": "datetime.timedelta",
      "seconds": 60,
      "name": "geonode is not working",
      "id": 2
    },
    "field_name": "network.in.rate.min_value",
    "id": 7,
    "unit": "B/s"
  }
}
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.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": [
            "This field is required."
        ],
        "name": [
```
(continues on next page)
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>name</th>
<th>Name of notification (geonode doesn’t work)</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>This will check if geonode is serving any data</td>
</tr>
<tr>
<td>emails</td>
<td></td>
</tr>
<tr>
<td>user_thresholds</td>
<td></td>
</tr>
<tr>
<td>severity</td>
<td></td>
</tr>
</tbody>
</table>

Payload elements:

- `name, description` are values visible for user
- `severity` severity value
- `emails` is a list of emails, however, it is encoded to a string, where each email is in new line:

  ```
  email1@test.com
  email2@test.com
  ```

- `user_thresholds` is a json encoded list of per-metric-per-check configurations. Each element of list should be a 10-element list, containing:
  - name of metric
  - field check option (one of three values: `min_value, max_value or max_timeout`)
  - flag, if metric check can use service
  - flag, if metric check can use resource
  - flag, if metric check can use label
  - flag, if metric check can use ows service
  - minimum value for user input (no minimum check if None)
  - maximum value for user input (no maximum check if None)
  - steps count is a number of steps to generate for user input, so user can select value from select list instead of typing. This will have effect only if both min and max values are also provided Sample payload for `user_thresholds`:

```json

"This field is required."
],
"description": [
 "This field is required."
]
},
"data": [],
"success": false
}

1.18. Monitoring
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.
1.19 GeoNode Backup and Restore

1.19.1 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 created 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`):

```ini
[database]
pgdump = pg_dump
pgrestore = pg_restore

[geoserver]
datadir = geoserver/data
dumpvectordata = yes
dumprasterdata = yes

[fixtures]
# NOTE: Order is important
apps = contenttypes,auth,people,groups,account,guardian,admin,actstream,announcements,
     ...avatar,base,dialogs,documents,geoserver,invitations,pinax_notifications,layers,maps,
     ...oauth2_provider,services,sites,socialaccount,taggit,tastypie,upload,user_messages
dumps = contenttypes,auth,people,groups,account,guardian,admin,actstream,announcements,
     ...avatar,base,dialogs,documents,geoserver,invitations,pinax_notifications,layers,maps,
     ...oauth2_provider,services,sites,socialaccount,taggit,tastypie,upload,user_messages
```

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**

```ini
[database]
pgdump = 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**

```ini
[geoserver]
datadir = /opt/gs_data_dir
datadir_exclude_file_path =
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**

```ini
[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.document,taggit

dumps = people,accounts,avatars,backups,licenses,topiccategories,regions,resourcebases,
    → contactroles,links,restrictioncodetypes,spatialrepresentationtypes,useropermissions,
    → groupopermissions,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

```
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

```
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:

```bash
# -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.
10. --soft-reset: the restore procedure will preserve geoserver table / resources during the restore. By default the procedure will drop tables and resources
```

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

```bash
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)

```bash
$> docker ps

CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
--- --- --------------- --------------- ---------- ---------------
e9fc97a75d1a geonode/nginx:geoserver "/docker-entrypoint...." 2 hours ago Up 2 hours 0.0.0.0:80->80/tcp, 0.0.0.0:443->443/tcp nginx4my_geonode
c5496400b1b9 my_geonode_django "/bin/sh -c 'service..." 2 hours ago Up 2 hours nginx4my_geonode
cbc899f81fa28 my_geonode_celery "/bin/sh -c 'service..." 2 hours ago Up 2 hours celery4my_geonode
3b213400d630 geonode/geoserver:2.17.1 "/usr/local/tomcat/t..." 2 hours ago Up 2 hours geoserver4my_geonode
d2f59d70a0d3 geonode/postgis:11 "docker-entrypoint.s..." 2 hours ago Up 2 hours db4my_geonode

(continues on next page)
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
3f9ce0be7f88  rabbitmq  "docker-entrypoint.s..."  2 hours
→  ago  Up 2 hours  4369/tcp, 5671-5672/tcp, 25672/tcp
rabbitmq4my_geonode
02fdbce9ae73  geonode/letsencrypt:latest  "./docker-entrypoint..."  2 hours
→  ago  Up 14 seconds  geonode/letsencrypt:latest
→  my_geonode_letsencrypt_1

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

```
$> docker container exec -u 0 -it jenkins4my_geonode sh -c 'cat /var/jenkins_home/
secrets/initialAdminPassword'
b91e9d*****************373834
```

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.

Wait until Jenkins has finished configuring the plugins

Provide the administrator credentials as requested

Confirm the Jenkins instance URL, this can be changed from 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

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

1.19. GeoNode Backup and Restore
Getting Started

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
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
Create First Admin User

Username: admin
Password: **********
Confirm password: **********
Full name: Jenkins Admin
E-mail address: alessio.fabiani@geo-solutions.it
GeoNode Documentation, Release 3.2.1

1.19. GeoNode Backup and Restore

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, PR 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 2.38.2

Not now  Save and Finish
Getting Started

Jenkins is ready!
Your Jenkins setup is complete.

Start using Jenkins

Jenkins 2.235.2
1.19. GeoNode Backup and Restore
1.19. GeoNode Backup and Restore
GeoNode Backup and Restore

1.19. GeoNode Backup and Restore

Go back to the top page
(you can start using the installed plugins right away)

Restart Jenkins when installation is complete and no jobs are running
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.

   ```bash
   $> 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
$> vim docker-compose.yml
...
jenkins:
    image: jenkins/jenkins:lts
    container_name: jenkins4${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](http://localhost:9080/jenkins)

3. Add localhost Server to the *Publish over SSH* plugin configuration
   Mode to [http://localhost:9080/jenkins/configure](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*
1.19. GeoNode Backup and Restore
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*
   3. *TARGET_URL*

   **Warning:** Provide the correct URL of your GeoNode instance
1.19. GeoNode Backup and Restore

- **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: BKP_FOLDER_NAME
  - Default Value: backup_restore
  - Description: Shared Backup Folder name. The scripts assume it is located on "root" e.g.: $BKP_FOLDER_NAME/

- **String Parameter**
  - Name: SOURCE_URL
  - Default Value: http://localhost
  - Description: Source Server URL, the one generating the "backup" file.
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…
1.19. GeoNode Backup and Restore
1.19. GeoNode Backup and Restore
1.19. GeoNode Backup and Restore
Link the *backup_restore* folder to a local folder on the *HOST*

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. GeoNode Backup and Restore
1.20 GeoNode Components and Architecture

1.20.1 OAuth2 Security: Authentication and Authorization

GeoNode interacts with GeoServer through an advanced security mechanism based on OAuth2 Protocol and GeoFence. This section is a walk through of the configuration and setup of GeoNode and GeoServer Advanced Security.

What we will see in this section is:

- **Introduction**

- **GeoNode** (Security Backend):
  1. Django Authentication
  2. Django OAuth Toolkit Setup and Configuration
  3. Details on settings.py Security Settings

- **GeoServer** (Security Backend):
  1. GeoServer Security Subsystem
  2. Introduction to the GeoServer OAuth2 Security Plugin
  3. Configuration of the GeoNode REST Role Service
  4. Configuration of the GeoNode OAuth2 Authentication Filter
  5. The GeoServer Authentication Filter Chains
  6. Introduction to GeoFence Plugin, the Advanced Security Framework for GeoServer

- **Troubleshooting and Advanced Features**:
  1. Common Issues and Fixes
  2. How to setup HTTPS secured endpoints
  3. GeoFence Advanced Features

**Introduction**

GeoServer, i.e. the geospatial backend server of GeoNode, is a spatial server which needs authenticated users in order to access protected resources or administration functions.

GeoServer supports several kind of Authentication and Authorization mechanisms. Those systems are pluggable and GeoServer can use them at the same time by the use of a Filter Chain. Briefly this mechanism allows GeoServer to check for different A&A protocols one by one. The first one matching is used by GeoServer to authorize the users.

GeoNode Authentication is based by default on Django Security Subsystem. Django authentication allows GeoNode to manage its internal users, groups, roles and sessions.

GeoNode has some external components, like GeoServer or QGIS Server, which are pluggable and stand-alone services, devoted to the management of geospatial data. Those external services have their own authentication and authorization mechanisms which must be synchronized somehow with the GeoNode one. Also, those external services maintain, in most of the cases and unless specific configuration does not disable this, alternative security access which for instance allow GeoNode to modify the geospatial catalog under the hood, or a system administrator to have independent and privileged access to the servers.

Before going deeply on how GeoServer/GeoNode A&A works and how it can be configured in order to work correctly with GeoNode, 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/3.2/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.

If in doubt, please use the default values here below.

Default values are:

```python
...# OGC (WMS/WFS/WCS) Server Settings
# OGC (WMS/WFS/WCS) Server Settings
OGC_SERVER = {
    'default': {
        'BACKEND': 'geonode.geoserver',
        'LOCATION': GEOSERVER_LOCATION,
        'LOGIN_ENDPOINT': 'j_spring_oauth2_geonode_login',
        'LOGOUT_ENDPOINT': 'j_spring_oauth2_geonode_logout',
        # PUBLIC_LOCATION needs to be kept like this because in dev mode
        # the proxy won't work and the integration tests will fail
        # the entire block has to be overridden in the local_settings
        'PUBLIC_LOCATION': GEOSERVER_PUBLIC_LOCATION,
        'USER': 'admin',
        'PASSWORD': 'geoserver',
        'MAPFISH_PRINT_ENABLED': True,
        '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.

**Note:** Further details can be found directly on the official GeoServer documentation at section “Authentication Chain”

From the GeoNode backend (server) side, the server will make use of Basic Authentication with administrator credentials to configure the GeoServer catalog. GeoServer must be reachable by GeoNode of course, and GeoNode must know the internal GeoServer admin credentials.

From the GeoNode frontend (browser and GUI) side, the Authentication goal is to allow GeoServer to recognize as valid a user which has been already logged into GeoNode, providing kind of an SSO mechanism between the two applications.

GeoServer must know and must be able to access GeoNode via HTTP/HTTPS. In other words, an external user connected to GeoNode must be authenticated to GeoServer with same permissions. This is possible through the OAuth2 Authentication Protocol.

**GeoNode / GeoServer Authentication Mechanism**

*GeoNode as OAuth2 Provider (OP)*

OpenID Connect is an identity framework built on OAuth 2.0 protocol which extends the authorization of OAuth 2.0 processes to implement its authentication mechanism. OpenID Connect adds a discovery mechanism allowing users to use an external trusted authority as an identity provider. From another point of view, this can be seen as a single sign on (SSO) system.

OAuth 2.0 is an authorization framework which is capable of providing a way for clients to access a resource with restricted access on behalf of the resource owner. OpenID Connect allows clients to verify the users with an authorization server based authentication.

As an OP, GeoNode will be able to act as trusted identity provider, thus allowing the system working on an isolated environment and/or allow GeoNode to authenticate private users managed by the local DJango auth subsystem.

*GeoServer as OAuth2 Relying Party (RP)*

Thanks to the OAuth2 Authentication GeoServer is able to retrieve an end user’s identity directly from the OAuth2 Provider (OP).

With GeoNode acting as an OP, the mechanism will avoid the use of cookies relying, instead, on the OAuth2 secure protocol.

How the OAuth2 Protocol works:
1. The relying party sends the request to the OAuth2 provider to authenticate the end user
2. The OAuth2 provider authenticates the user
3. The OAuth2 provider sends the ID token and access token to the relying party
4. The relying party sends a request to the user info endpoint with the access token received from OAuth2 provider
5. The user info endpoint returns the claims.

GeoNode / GeoServer Authorization Mechanism

Allowing GeoServer to make use of 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 enable 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:

```
INSTALLED_APPS = (
    'modeltranslation',
    ...
    'guardian',
    'oauth2_provider',
    ...
) + GEONODE_APPS
```

MIDDLEWARE_CLASSES

Installing the `oauth2_provider` Django application is not sufficient to enable the full functionality. We need also GeoNode to include additional entities to its internal model.

Default values are:

```
MIDDLEWARE_CLASSES = (
    'django.middleware.common.CommonMiddleware',
    'django.contrib.sessions.middleware.SessionMiddleware',
    'django.contrib.messages.middleware.MessageMiddleware',
    # The setting below makes it possible to serve different languages per
    # user depending on things like headers in HTTP requests.
    'django.middleware.locale.LocaleMiddleware',
    'pagination.middleware.PaginationMiddleware',
    'django.middleware.csrf.CsrfViewMiddleware',
    'django.contrib.auth.middleware.AuthenticationMiddleware',
    'django.middleware.clickjacking.XFrameOptionsMiddleware',

    # If you use SessionAuthenticationMiddleware, be sure it appears before
    # OAuth2TokenMiddleware.
    # SessionAuthenticationMiddleware is NOT required for using django-oauth-toolkit.
    'django.contrib.auth.middleware.SessionAuthenticationMiddleware',
    'oauth2_provider.middleware.OAuth2TokenMiddleware',
)
```

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**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
     python manage.py makemigrations
     python manage.py migrate
     python manage.py syncdb
     ```
   • Prepare the static data
     ```python
     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
     python manage.py loaddata initial_data.json
     ```
   • Make sure there exists a superuser for your environment
Warning: Deprecated this command will be replaced by migrations in the future, so be careful.

```
python manage.py createsuperuser
```

**Note:** Read the base tutorials on GeoNode Developer documentation for details on the specific commands and how to use them.

2. Start the application

Start GeoNode accordingly on how the setup has been done; run debug mode through `paver`, or proxied by an HTTP Server like Apache2 HTTPD, Nginx or others.

3. Finalize the setup of the OAuth2 Provider

First of all you need to configure and create a new OAuth2 Application called `GeoServer` through the GeoNode Admin Dashboard

- Access the GeoNode Admin Dashboard
- Go to Django OAuth Toolkit > Applications
- Update or create the Application named `GeoServer`

**Warning:** The Application name **must** be `GeoServer`

- **Client id:** An alphanumeric code representing the OAuth2 Client Id. GeoServer OAuth2 Plugin **will use** this value.

**Warning:** In a production environment it is **highly** recommended to modify the default value provided with GeoNode installation.

- **User:** Search for the `admin` user. Its ID will be automatically updated into the form.
- **Redirect uris:** It is possible to specify many URI's here. Those must coincide with the GeoServer instances URI's.
- **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`
Menu

- Upload Layers
- Profile
- Recent Activity
- Inbox
- Announcements
- Remote Services
- Invite User

- GeoServer
- Admin
- Help

Logout

Django OAuth Toolkit

<table>
<thead>
<tr>
<th>Access tokens</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Grants</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Refresh tokens</td>
<td>Add</td>
<td>Change</td>
</tr>
</tbody>
</table>
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

   ![GeoServer GUI](image)

   - Please read the file security/masterkey.info and remove it afterwards. This file is a security risk.
   - The default user/group service should use digest password encoding.
   - The administrator password for this server has not been changed from the default. It is highly recommended that you change it now. Change it.
   - No strong cryptography available, installation of the unrestricted policy file is recommended.
   - This GeoServer instance is running version 2.9-SNAPSHOT. For more information please contact the administrator.

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
Security

- Settings
- Authentication
- Passwords
- Users, Groups, Roles
- GeoFence
- GeoFence Data Rules
- GeoFence Admin Rules

Role 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 role service</td>
<td>ADMIN</td>
</tr>
<tr>
<td>geonode REST role service</td>
<td>Authth/REST Role Service</td>
<td>ROLE_ADMIN</td>
</tr>
</tbody>
</table>

Results 1 to 2 (out of 2 items)

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>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>Default XML user/group service</td>
</tr>
</tbody>
</table>

Results 1 to 1 (out of 1 item)

Role Services

- Add new
- Remove selected
4. **If not yet configured** the service geonode REST role service, choose AuthKEY REST - Role service from REST endpoint

### 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
Authentication
Configure global security settings
Users, Groups, Roles
Data
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

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

Security
- Settings
- Authentication
- PSWords
- Use Authentication providers and settings
- Data

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

Authentication Filters
- Add new
- Remove selected

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>anonymous</td>
<td>Anonymous authentication</td>
</tr>
<tr>
<td>basic</td>
<td>Basic HTTP authentication</td>
</tr>
<tr>
<td>form</td>
<td>Form authentication</td>
</tr>
<tr>
<td>geonode-oauth2</td>
<td>Authentication using a GeoNode OAuth2</td>
</tr>
<tr>
<td>geonodeAnonymous</td>
<td>Authentication using a GeoNode OAuth2</td>
</tr>
<tr>
<td>geonodeProcessing</td>
<td>Authentication using a GeoNode OAuth2</td>
</tr>
<tr>
<td>rememberme</td>
<td>Remember me authentication</td>
</tr>
</tbody>
</table>

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
New Authentication Filter

Create and configure a new Authentication Filter

- **J2EE** - Delegates to servlet container for authentication
- **GeoNode CAuth2** - Authenticates by looking up for a valid GeoNode OAuth2 access_token key sent as URL parameter

**Authentication using a GeoNode OAuth2 geonode-oauth2**

Authenticates by looking up for a valid GeoNode OAuth2 access_token key sent as URL parameter

- **None**
  - geonode-oauth2
- **OAuth2 provider connection**
  - **Enable Redirect Authentication EntryPoint**
    - /j_spring_oauth2_geonode_login
- **Login Authentication EndPoint**
  - /j_spring_oauth2_geonode_login
- **Logout Authentication EndPoint**
  - /j_spring_oauth2_geonode_logout
- **Force Access Token URI HTTPS Secured Protocol**
  - /j_spring_oauth2_geonode_login
- **Access Token URI**
  - Set this to http://<geonode_host_base_url>/o/token/

- **Force User Authorization URI HTTPS Secured Protocol**
  - /j_spring_oauth2_geonode_logout
- **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

   ![Security](image)

2. Identify the section Filter Chains

3. Make sure the web Filter Chain is configured as shown below

   ![Warning](image)

   *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)
4. Make sure the `rest` Filter Chain is configured as shown below.

![Provider Chain](image)

**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

```
Provider Chain
Available
<table>
<thead>
<tr>
<th>geonodeAuthProvider</th>
</tr>
</thead>
</table>
```

**Warning:** Every time you modify a Filter Chain, **do not forget to save** the Authentication settings. This **must** be done for **each** change.
6. Make sure the **default** Filter Chain is configured as shown below

![Filter Chain Diagram]

**Warning:** Every time you modify a Filter Chain, **don't forget to save** the Authentication settings. This **must** be done for each change.
7. Add the GeoNode Login Endpoints to the comma-delimited list of the webLogin Filter Chain

Filter chain

Configure an individual filter chain

Chain settings

Name
webLogin

Comma delimited list of ANT patterns (with optional query string)

[jth2_geonode_login, j_spring_oauth2_geonode_login]

- Disable security for this chain
- Allow creation of an HTTP session for storing the authentication token
- Accept only SSL requests

Role filter

Warning: Every time you modify a Filter Chain, don't forget to save the Authentication settings. This must be done for each change.
8. Add the GeoNode Logout Endpoints to the comma-delimited list of the webLogout Filter Chain

**Filter chain**

Configure an individual filter chain

**Chain settings**

Name

webLogout

Comma delimited list of ANT patterns (with optional query string)

2.geonode_logout,ji_spring_oauth2.geonode_logout

- Disable security for this chain
- Allow creation of an HTTP session for storing the auth
- Accept only SSL requests

**Warning:** Every time you modify a Filter Chain, do not 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:

```xml
<logoutFilter>
  ...
  <redirectURL>/web/</redirectURL>
  <formLogoutChain>/j_spring_security_logout,/j_spring_security_logout,/j_spring_oauth2_geonode_logout,/j_spring_oauth2_geonode_logout/</formLogoutChain>
</logoutFilter>
```

**Warning:** The value `j_spring_oauth2_geonodeLogout` must be the same specified as Logout Authentication EndPoint in the `geonode-oauth2 - Authentication using a GeoNode OAuth2` above.
Setup and test of the GeoFence Server and Default Rules

In order to work correctly, GeoServer needs the GeoFence Embedded Server plugin to be installed and configured on the system.

The GeoServer configuration provided for GeoNode, has the plugin already installed with a default configuration. In that case double check that the plugin works correctly and the default rules have been setup by following the next steps.

Preliminary checks

- GeoServer is up and running and you have admin rights
- The GeoFence Embedded Server plugin has been installed on GeoServer

Setup of the GeoServer Filter Chains

1. Access the Security > Authentication section

2. Identify the section Authentication Providers and make sure the geofence Authentication Provider is present

3. Make sure the Provider Chain is configured as shown below

   Warning: Every time you modify 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
Security

Settings
Authentication
Passwords
Users, Groups, Roles
Data
Services
WPS security
GeoFence
GeoFence Data Rules
GeoFence Admin Page

Connection successful

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
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

   **Security**
   - Settings
   - Authentication
   - Passwords
   - Users, Groups, Roles
   - Data
   - Services
   - WPS security
   - GeoFence
   - GeoFence Data Rules
   - GeoFence Admin Rules

   Configure data rules for the internal GeoFence server.

   • 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

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>

**Warning:** If that rule does not exists at the very bottom (this rule is **always** the last one), add it manually.

• Access the Security > GeoFence Admin Rules section

• No Rules needed here
Troubleshooting and Advanced Features

Common Issues and Fixes

- GeoServer/GeoNode OAuth2 does not authenticate as Administrator even using GeoNode admin users

  **Symptoms**

  When trying to authenticate with an admin user using OAuth2, the process correctly redirects to GeoServer page but I'm not a GeoServer Administrator.

  **Cause**

  That means that somehow GeoServer could not successfully complete the Authorization and Authentication process.

  The possible causes of the problem may be the following ones:

  1. The OAuth2 Authentication fails on GeoServer side

     This is usually due to an exception while trying to complete the Authentication process.

        - A typical cause is that GeoServer tries to use HTTPS connections but the GeoNode certificate is not trusted;

     In that case please refer to the section below. Also take a look at the logs (in particular the GeoServer one) as explained in debug_geonode. The GeoServer logs should contain a detailed Exception explaining the cause
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

```bash
 curl http://localhost/api/adminRole
$> {"adminRole": "admin"}
```

```bash
 curl http://localhost/api/users
$> {"users": [{"username": "AnonymousUser", "groups": []}, {"username": "afabiani", "groups": []}, {"username": "admin", "groups": ["anonymous", "test", "admin"]}]}
```

```bash
 curl http://localhost/api/roles
$> {"groups": ["anonymous", "test", "admin"]}
```

```bash
 curl http://localhost/api/users/admin
$> {"users": [{"username": "admin", "groups": ["anonymous", "test", "admin"]}]}
```
How to setup HTTPS secured endpoints

In a production system it is a good practice to encrypt the connection between GeoServer and GeoNode. That would be possible by enabling HTTPS Protocol on the GeoNode REST Role Service APIs and OAuth2 Endpoints.

Most of the times you will rely on a self-signed HTTPS connection using a generated certificate. That makes the connection untrusted and you will need to tell to the GeoServer Java Virtual Machine to trust it.

This can be done by following the steps below.

For any issue take a look at the logs (in particular the GeoServer one) as explained in debug_geonode. The GeoServer logs should contain a detailed Exception explaining the cause of the problem.

SSL Trusted Certificates

When using a custom Keystore or trying to access a non-trusted or self-signed SSL-protected OAuth2 Provider from a non-SSH connection, you will need to add the certificates to the JVM Keystore.

In order to do this you can follow the next steps:

In this example we are going to

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)
1.20. GeoNode Components and Architecture
keytool -import -noprompt -trustcacerts -alias geonode -file geonode.cert -keystore ${KEYSTOREFILE} -storepass ${KEYSTOREPASS}

or, alternatively, you can use some graphic tool which helps you managing the SSL Certificates and Keystores, like Portecle

```
java -jar c:\apps\portecle-1.9\portecle.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.
No keystore loaded
F:\tmp\keystore.key - Portecle

<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://maven.geo-solutions.it/org/˓
  hibernatespatial/hibernate-spatial-postgis/1.1.3.2/hibernate-spatial-
  postgis-1.1.3.2.jar" -O hibernate-spatial-postgis-1.1.3.2.jar
wget --no-check-certificate "https://repo1.maven.org/maven2/org/postgis/˓
  postgres-jdbc/1.3.3/postgis-jdbc-1.3.3.jar" -O postgis-jdbc-1.3.3.jar

cp hibernate-spatial-postgis-1.1.3.2.jar <GEOSERVER_WEBAPP_DIR>/WEB-INF/lib

cp postgis-jdbc-1.3.3.jar <GEOSERVER_WEBAPP_DIR>/WEB-INF/lib

cp postgres-jdbc-1.3.3.jar <GEOSERVER_WEBAPP_DIR>/WEB-INF/lib

cp postgres-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)

```properties
<GEOSERVER_DATA_DIR>/geofence/geofence-datasource-ovr.properties
```

```
# /* (c) 2019 Open Source Geospatial Foundation - all rights reserved
# * This code is licensed under the GPL 2.0 license, available at the root
# * application directory.
# */
#
geofenceVendorAdapter.databasePlatform=org.hibernatespatial.postgis.PostgisDialect
geofenceDataSource.driverClassName=org.postgresql.Driver
geofenceDataSource.url=jdbc:postgresql://localhost:5432/geofence
geofenceDataSource.username=postgres
geofenceDataSource.password=postgres
geofenceEntityManagerFactory.jpaPropertyMap[hibernate.default_schema]=public

###########################################################################
## Other setup entries
###########################################################################
## hbm2ddl.auto may assume one of these values:
## - validate: validates the DB schema at startup against the internal model. May fail on oracle spatial.
## - update: updates the schema, according to the internal model. Updating automatically the production DB is dangerous.
## - create-drop: drop the existing schema and recreates it according to the internal model. REALLY DANGEROUS, YOU WILL LOSE YOUR DATA.
## You may want not to redefine the property entirely, in order to leave the default value (no action).

geofenceEntityManagerFactory.jpaPropertyMap[hibernate.hbm2ddl.auto]=update
geofenceEntityManagerFactory.jpaPropertyMap[javax.persistence.validation.mode]=none
geofenceEntityManagerFactory.jpaPropertyMap[hibernate.validator.apply_to_ddl]=false
```

(continues on next page)
1.21 Hardening GeoNode

1.21.1 Publish on other than HTTP port (for e.g. 8082)

By default geonode will be installed in the port 80 (i.e. HTTP port). But what if you want to change the port of the geonode to other than HTTP port (For this example, I am taking 8082 port)? We need to edit couple of things in the web configuration. First things is, we need to update the `/etc/uwsgi/apps-enabled/geonode.ini` file,

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

Edit the following lines,

```ini
env = SITE_HOST_NAME=localhost:8082
env = SITEURL=http://localhost:8082
SITE_HOST_NAME=localhost
SITE_HOST_PORT=8082
```

(continues on next page)
After that we need to update the `/etc/nginx/sites-enabled/geonode` file.

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

Edit the following lines,

```
server {
    listen 8082 default_server;
    listen [::]:8082 default_server;
}
```

## 1.22 Social Login

### 1.22.1 GeoNode Social Accounts

**Contents**

- *GeoNode Social Accounts*
  - Allow GeoNode to Login through Social Accounts (Facebook and LinkedIn)
    - *Base concepts and objects*
    - *Installation*
    - *Configuration*
    - *Usage*
      - LinkedIn Application
      - Facebook Application
    - *Login by using Existing Accounts on GeoNode*

### 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

  ![Connected social accounts and e-mail accounts](image)

• 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

```bash
pip install -r requirements.txt --upgrade
pip install -e . --upgrade --no-cache
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
```

(continues on next page)
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',
            'public_profile',
        ],
        'FIELDS': [
            'id',
            'email',
            'name',
            'first_name',
            'last_name',
            'verified',
            'locale',
            'timezone',
            'link',
            'gender',
        ],
    },
}

# Comment out this in case you want to disable Social login
SOCIALACCOUNT_PROFILE_EXTRACTORS = {
    "facebook": "geonode.people.profileextractors.FacebookExtractor",
    "linkedin_oauth2": "geonode.people.profileextractors.LinkedInExtractor",
}
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
2. Create a new Company

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:

```html
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:** [Client ID]
- **Client Secret:** [Client Secret]

**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>--&gt; App Id</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Secret</td>
<td>--&gt; 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
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

```bash
# 1. install geonode (not shown here for brevity)
# 2. install systemwide LDAP libraries
sudo apt install \
  libldap2-dev \
  libsasl2-dev

# 3. get geonode/contribs code
git clone https://github.com/GeoNode/geonode-contribs.git

# 4. install geonode ldap contrib package
cd geonode-contribs/ldap
pip install .
```

**Configuration**

1. Add `geonode_ldap.backend.GeonodeLdapBackend` as an additional auth backend.

```python
# e.g. by updating your settings.py or local_settings.py
AUTHENTICATION_BACKENDS += (  
    "geonode_ldap.backend.GeonodeLdapBackend",
)
```

You may use additional auth backends, the django authentication framework tries them all according to the order listed in the settings. This means that geonode can be setup in such a way as to permit internal organization users to login with their LDAP credentials, while at the same time allowing for casual users to use their facebook login (as long as you enable facebook social auth provider).

**Note:** The django’s `django.contrib.auth.backends.ModelBackend` must also be used in order to provide full geonode integration with LDAP. However this is included by default on GeoNode settings.
# 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_URI")
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"
]
# these are not needed by django_auth_ldap - we use them to find and match
# GroupProfiles and GroupCategories
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:

<table>
<thead>
<tr>
<th>Environment Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDAP_SERVER_URL=ldap://&lt;the_ldap_server&gt;</td>
</tr>
<tr>
<td>LDAP_BIND_DN=uid=ldapinfo,cn=users,dc=ad,dc=example,dc=org</td>
</tr>
<tr>
<td>LDAP_BIND_PASSWORD=&lt;something_secret&gt;</td>
</tr>
<tr>
<td>LDAP_USER_SEARCH_DN=dc=ad,dc=example,dc=org</td>
</tr>
<tr>
<td>LDAP_USER_SEARCH_FILTERSTR=(&amp;(uid=%(user)s)(objectClass=person))</td>
</tr>
<tr>
<td>LDAP_MIRROR_GROUPS=True</td>
</tr>
<tr>
<td>LDAP_GROUP_SEARCH_DN=cn=groups,dc=ad,dc=example,dc=org</td>
</tr>
<tr>
<td>LDAP_GROUP_SEARCH_FILTERSTR=(&amp;(cn=abt1)(cn=abt2)(cn=abt3)(cn=abt4)(cn=abt5)(cn=abt6))</td>
</tr>
<tr>
<td>LDAP_GROUP_PROFILE_MEMBER_ATTR=uniqueMember</td>
</tr>
</tbody>
</table>

The configuration seen in the example above will allow LDAP users to login to geonode with their LDAP credentials.

On first login, a geonode user is created from the LDAP user and its LDAP attributes cn and sn are used to populate the geonode user’s first_name and last_name profile fields.

Any groups that the user is a member of in LDAP (under the cn=groups, dc=ad, dc=example, dc=org search base and belonging to one of (cn=abt1)(cn=abt2)(cn=abt3)(cn=abt4)(cn=abt5)(cn=abt6) groups) will be mapped to the corresponding geonode groups, even creating these groups in geonode in case they do not exist yet. The geonode user is also made a member of these geonode groups.

Upon each login, the user’s geonode group memberships are re-evaluated according to the information extracted from LDAP. The AUTH_LDAP_MIRROR_GROUPS_EXCEPT setting can be used to specify groups whose memberships will not be re-evaluated.

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 threatened as pure internal GeoNode ones.

You may also manually generate the geonode groups in advance, before users login. In this case, when a user logs in and the mapped LDAP group already exists, the user is merely added to the geonode group.

Be sure to check out `django_auth_ldap` for more information on the various configuration options.

### Keep Users and Groups Synchronized

In order to constantly keep the remote LDAP Users and Groups synchronized with GeoNode, you will need to run periodically some specific management commands.

```
*/10 * * * * /opt/geonode/my-geonode/manage.sh updateldapgroups  >> /var/log/cron.log 2>&1
*/10 * * * * /opt/geonode/my-geonode/manage.sh updateldapusers  >> /var/log/cron.log 2>&1
```

Where the `manage.sh` is a bash script similar to the following one:

```
manage.sh

export $(grep -v '^#' /opt/geonode/my-geonode/.env | xargs -d '
') ; /home/<my_user>/...virtualenvs/geonode/bin/python /opt/geonode/my-geonode/manage.py $@
```

and the `/opt/geonode/my-geonode/.env` is something similar to the following one:

```
/opt/geonode/my-geonode/.env

DEBUG=False
DJANGO_ALLOWED_HOSTS=<geonode_public_host>,localhost,127.0.0.1
DJANGO_DATABASE_URL=postgresql://my_geonode:**********@localhost:5432/my_geonode_db
DEFAULT_BACKEND_UPLOADER=geonode.importer
DEFAULT_FROM_EMAIL=geonode@example.org
DJANGO_EMAIL_HOST=smtp.example.org
DJANGO_EMAIL_HOST_PASSWORD=**********
DJANGO_EMAIL_HOST_USER=geonode
DJANGO_EMAIL_PORT=465
DJANGO_EMAIL_USE_SSL=True
DJANGO_SETTINGS_MODULE=my_geonode.settings
DJANGO_SECRET_KEY=**********
OAUTH2_API_KEY=**********
PROXY_URL=/proxy/?url=
EXIF_ENABLED=True
EMAIL_ENABLE=True
TIME_ENABLE=True
ACCOUNT_OPEN_SIGNUP=True
ACCOUNT_APPROVAL_REQUIRED=True
ACCOUNT_EMAIL_REQUIRED=True
ACCOUNT_EMAIL_VERIFICATION=optional
AVATAR_GRAVATAR_SSL=True
GEONODE_DB_URL=postgresql://my_geonode:**********@localhost:5432/my_geonode_data
GEOSERVER_ADMIN_PASSWORD=**********
GEOSERVER_LOCATION=https://<geonode_public_host>/geoserver/
```

(continues on next page)
Note: You might want to use the same `/opt/geonode/my-geonode/.env` for your UWSGI configuration too:

```
[uwsgi]
socket = 0.0.0.0:8000
uid = <my_user>
gid = www-data

plugins = python3
virtualenv = /home/<my_user>/virtualenvs/geonode

# set environment variables from .env file
env LANG=en_US.utf8
env LC_ALL=en_US.UTF-8
env LC_LANG=en_US.UTF-8

for readline = /opt/geonode/my-geonode/.env
    env = %(_)
endfor =

chdir = /opt/geonode/my-geonode
module = my_geonode.wsgi:application

processes = 12
threads = 2
enable-threads = true
master = true
```
# logging
# path to where uwsgi logs will be saved
logto = /storage/my_geonode/logs/geonode.log
daemonize = /storage/my_geonode/logs/geonode.log
touch-reload = /opt/geonode/my-geonode/my_geonode/wsgi.py
buffer-size = 32768
max-requests = 500
harakiri = 300 # respawn processes taking more than 5 minutes (300 seconds)
harakiri-verbose = true
vacuum = true
thunder-lock = true

## 1.23.2 Geonode Logstash for centralized monitoring/analytics

This contrib app, along with the GeoNode internal monitoring app, lets administrators to configure a service for sending metrics data to a centralized server which comes with Logstash.

So it will be possible to visualize stats and charts about one or more GeoNode instances outside the application. Having a server configured with the ELK stack, it is possible to visualize those information on a Kibana dashboard for example.

If you manage more than one GeoNode instances, that server can receive data from many GeoNode(s) so it can make available both single-instance dashboards (referred to individual instances) and global dashboards (stats calculated on the whole set of instances).

---

**Warning:** The centralized monitoring service cannot be active if the settings variables `USER_ANALYTICS_ENABLED` and monitoring-enabled are set to `False`.

---

### Overview

By default, GeoNode will send data to the centralized server every **3600 seconds** (1 hour) so, if enabled, the monitoring app will collect 1-hour-aggregated data. This time interval can be configured, see the next paragraphs to know how.

Formatted and compressed data will be sent on a TCP connection (on the 443 standard port by default) through a scheduled celery task which basically logs information via python-logstash-async.
Warning: This feature requires python-logstash-async.

Data and events formats

Each time the centralized monitoring service is called, 4 types of JSON formatted events are sent to the server:

1. Instance overview

   
   ```json
   {
   "format_version": "1.0",
   "instance": {
     "name": geonode instance HOSTNAME,
     "ip": geonode instance IP
   },
   "time": {
     "startTime": UTC now - 1 hour (default)
     "endTime": UTC now
   },
   "hits": total number of requests,
   "unique_visits": total number of unique sessions,
   "unique_visitors": total number of unique users,
   "registered_users": total number of registered users at the end time,
   "layers": total number of layers at the end time,
   "documents": total number of documents at the end time,
   "maps": total number of maps at the end time,
   "errors": total number of errors
   }
   ```

2. Resources details

   ```json
   {
   "format_version": "1.0",
   "instance": {
     "name": geonode instance HOSTNAME,
     "ip": geonode instance IP
   },
   "time": {
     "startTime": UTC now - 1 hour (default)
     "endTime": UTC now
   },
   "resources": [
     ...
     {
       "type": resource type,
       "name": resource name,
       "url": resource URL,
       "hits": total number of requests about this resource,
       "unique_visits": total number of unique sessions about this resource,
       "unique_visitors": total number of unique users about this resource,
       "downloads": total number of resource downloads,
       "ogcHits": total number of OGC service requests about this resource,
       "publications": total number of publication events
   }
   ```

(continues on next page)
3. Countries details

```json
{
    "format_version": "1.0",
    "instance": {
        "name": geonode instance HOSTNAME,
        "ip": geonode instance IP
    },
    "time": {
        "startTime": UTC now - 1 hour (default)
    },
    "countries": [
        ...
    ]
}
```

4. UA (User Agent) Family details

```json
{
    "format_version": "1.0",
    "instance": {
        "name": geonode instance HOSTNAME,
        "ip": geonode instance IP
    },
    "time": {
        "startTime": UTC now - 1 day
    },
    "ua_families": [
        ...
    ]
}
```

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:

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"
    }
  }
}
```

(continues on next page)
} 
} 
geoip { 
  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:

<table>
<thead>
<tr>
<th>PERIODIC TASKS</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crontabs</td>
<td>✦</td>
<td>✎</td>
</tr>
<tr>
<td>Intervals</td>
<td>✦</td>
<td>✎</td>
</tr>
<tr>
<td>Periodic tasks</td>
<td>✦</td>
<td>✎</td>
</tr>
<tr>
<td>Solar events</td>
<td>✦</td>
<td>✎</td>
</tr>
</tbody>
</table>

The *dispatch-metrics-task* task:
The task details:

- **Name:** dispatch-metrics-task
- **Task (registered):**
- **Task (custom):** toring.tasks.dispatch_metrics
- **Enabled:**
- **Schedule:**
  - **Interval:** every 3600 seconds
  - **Crontab:**
  - **Solar:**
- **Arguments (show):**
- **Execution Options (show):**
Warning: When disabling monitoring is a **good practice** to disable the corresponding Periodic Task too.

**Management command**

In addition to the scheduled task, this contrib app makes also available the `dispatch_metrics` command to manually send metrics to the server. Obviously the time interval considered will start at the last successful delivery and will finish at the current time.

When the monitoring plugin is enabled (**USER_ANALYTICS_ENABLED** and monitoring-enabled are set to **True**) and a **GeoNode Logstash for centralized monitoring/analytics** configured, Geonode sends (hourly by default) metrics data to an external server (which comes with Logstash) for stats visualization and analysis.

The command can be launched using the `manage.py` script. No options are required.

$ `DJANGO_SETTINGS_MODULE=<your_settings_module>` python manage.py dispatch_metrics

Possible exceptions raised during the execution will be reported to GeoNode log.

### 1.24 GeoNode Admins Guide

GeoNode has an administration panel, based on the Django admin, which can be used to do some database operations. Although most of the operations can and should be done through the normal GeoNode interface, the admin panel provides a quick overview and management tool over the database.

The following sections will explain more in depth what functionalities the admin panel makes available to you. 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**.

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 by clicking on the username on the right side of the navigation bar, which will open a dropdown.

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.
Fig. 215: *The GeoNode Admin Interface*

Fig. 216: *The Change Password Link*
Fig. 217: The Change Password Form

Fig. 218: List of available Themes

Fig. 219: Theme Name and Description
Fig. 220: Theme Name and Description

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.

The next section, allows you to define the first important Theme properties. This part involves the GeoNode main page sections.

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.

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 content 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.
Fig. 221: *Jumbotron and Logo options*

Fig. 222: *GeoNode Default Home*
Fig. 223: *Updating Jumbotron and Logo*

![Jumbotron background](image)

- **Jumbotron background**: Browse... No file selected.
- **Hide text in the jumbotron**: Check this if the jumbotron background image already contains text.
- **Welcome theme**: jumbotron background
  - Choose between using jumbotron background and slide show.

Fig. 224: *Hide Jumbotron text*

![Jumbotron with Hide option](image)

- **Welcome theme**: jumbotron background
  - Choose between using jumbotron background and slide show.
- **Welcome theme**: slide show
  - Choose between using jumbotron background and slide show.
- **Jumbotron slide show**
  - slide 1 <Enabled: [X]> Hide Text: [X]
  - slide 2 <Enabled: [X]> Hide Text: [X]
  - slide 3 <Enabled: [X]> Hide Text: [X]

Hold down "Control", or "Command" on a Mac, to select more than one.
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).

**Add jumbotron theme slide**

<table>
<thead>
<tr>
<th>Slide name</th>
<th>New Slide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumbotron slide</td>
<td>Choose file</td>
</tr>
<tr>
<td>background</td>
<td></td>
</tr>
<tr>
<td>Jumbotron slide</td>
<td># Write Markdown Here To Format Slide Content</td>
</tr>
<tr>
<td>content</td>
<td>This is a paragraph in a slide content</td>
</tr>
<tr>
<td></td>
<td>Fill in this section with markdown</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Hide text in the</td>
<td>Check this if the jumbotron background image already contains text</td>
</tr>
<tr>
<td>jumbotron slide</td>
<td></td>
</tr>
<tr>
<td>Is enabled</td>
<td>Disable this slide will hide it from the slide show</td>
</tr>
</tbody>
</table>

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.

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.

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:
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).
Fig. 225: *Adding New Users*

![Add User](image1)

Fig. 226: *The Add User button in the Users List page*

![Users List](image2)

Fig. 227: *Add User Link*
Fig. 228: The User Details Page
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.

1.24.6 Change a User password

GeoNode administrators can also change/reset the password for those users who forget it. As shown in the picture below, click on this *form* link from the *User Details Page* to access the *Change Password Form*.

The *Change User Password Form* should looks like the following one. Insert the new password two times and click on *CHANGE PASSWORD*. 

---

**Fig. 229: The User in the People page**
Fig. 230: New Users Active by default

Fig. 231: Disabled Users
Fig. 232: Changing Users Passwords

Fig. 233: Changing Users Passwords
1.24.7 Promoting a User to Staff member or superuser

Active users have not access to admin tools. GeoNode makes available those tools only to Staff Members who have the needed permissions. Superusers are staff members with full access to admin tools (all permissions are assigned to them).

Administrators can promote a user to Staff Member by ticking the Staff status checkbox in the User Details Page. To make some user a Superuser, the Superuser status checkbox should be ticked. See the picture below.

![Django administration screen](image)

**Fig. 234: Staff and Superuser permissions**

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.

**Note:** The Create a New Group button on the Groups List Page allows to reach the Group Creation Form.

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 group category 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
Create a Group

**Title**

**Logo**

Choose File: No file chosen

**Description**

**Email**

Email used to contact one or all group members, such as a mailing list, shared email, or exchange group.

**Keywords**

A space or comma-separated list of keywords

**Access**

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**

test group category

Create

Fig. 236: The Group Creation Form
Cartographers

This group consists of GeoNode Cartographers

cartography

cartographers@gmail.com
test group category

Edit Group Details
Manage Group Members
Delete this Group
Group Activities
Permissions
This group is Public (invite-only)
Anyone may view this group but membership is by invitation only.
Managers
admin
No Group

Members

admin
No Organization info

Fig. 237: The Group Details Page
Fig. 238: *The Groups List Page*

Fig. 239: *The Groups Section on the Admin Panel*
Add group profile

- Title: Transportation planners
- Slug: transportation-planners
- Description: Users interested in transport
- Email: transportgroup@gmail.com
- Access:
  - Public: Any registered user can view and join a public group;
    - Private: Registered users cannot see any details about the group, including membership. Only invited users can join.

**Fig. 240: A new Group Profile**
Fig. 241: The Group Profiles List

Fig. 242: A new 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*.

![Groups Link in the navigation bar](image)

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;
Explore Groups

- Test group
  - Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum ...
  - 1 Member, 1 Manager

- Cartographers
  - This group consists of Geonode Cartographers
  - 1 Member, 1 Manager

- Transportation planners
  - Users interested in transport
  - 2 Members, 1 Manager

Fig. 245: Group Profiles List Page
Cartographers
Last Modified: Nov. 29, 2022, 9:56 a.m.

This group consists of GeoNode Cartographers

- cartography
- cartographers@gmail.com
- test group category

Edit Group Details
Manage Group Members
Delete this Group
Group Activities
Permissions
This group is Public (invite-only)
Anyone may view this group but membership is by invitation only.

Managers
- admin

Members
- admin
  No Organization info

Fig. 246: Group Profile Details Page
• **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.
  – **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.
• **Manage Group Members** (see next paragraphs).
• the *Delete this Group*, click on it to delete the Group Profile. GeoNode requires you to confirm this action.

![Confirm Group Deletion](image)

**Fig. 247: Confirm Group Deletion**

• the *Group Activities* drives you to the *Group Activities Page* where you can see all datasets, 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.
Activity Feed for Cartographers

No actions yet

Fig. 248: Group Activities

Update Group

Title
Cartographers

Logo
Currently: people_group/carto.jpeg
Clear
Change:
Choose File thumb.png

Description
This group consists of Geonode Cartographers

Fig. 249: Editing the Group 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.

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.

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.
Fig. 251: *Adding a new Member to the Group*

Fig. 252: *New Members of the Group*
1.24.10 Group based advanced data workflow

By default GeoNode is configured to make every resource 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 resources 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 resource is linked (this information is filled in the metadata), the members of this group, and the GeoNode Administrators.

Before being published, the resource will follow a two-stage review process, which is described below:

How to enable the advanced workflow

You have to tweak the GeoNode settings accordingly.

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 dataset, document or map is linked is to check that the uploaded item is correct. Particularly, in the case of a dataset 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 dataset, 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 dataset, document or map.

When the Manager considers that the resource is ready to be published, he should approve it. To do so, the Manager goes to the resource detail page, then opens the Edit 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.

The publication by the GeoNode Administrator

Prior to the public release of an approved resource, 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 resource, as well as its responsible.

Once the resource 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 datasets, 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 contact role button in the Base -> Contact Roles section:

Clicking on the People section (see figure) will open a web form with some personal information plus a section called Users.

It is important that this last section is not modified here unless the administrator is very confident in that operation.
1.24.12 Manage datasets using the admin panel

Some of the datasets information can be edited directly through the admin interface although the best place is in the Dataset -> Metadata Edit in GeoNode.

Clicking on the Admin > Dataset > Datasets link will show the list of available datasets.

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Attributes</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Datasets</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Styles</td>
<td>+</td>
</tr>
</tbody>
</table>

**Warning:** It is not recommended to modify the Datasets’ Attributes or Styles directly from the Admin dashboard unless you are aware of your actions.

The Metadata information can be changed for multiple datasets at once through the Metadata batch edit action. Select the datasets you want to edit in the batch and at the bottom, enter the Metadata batch edit action then click Go.

This will open a form with the information you can edit in a batch. see picture below.

By clicking over one Dataset 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 resource Edit Metadata or Advanced Metadata tools in order to edit the metadata info.

The Permissions can be changed also for multiple Datasets at once through the Set permissions action.

By clicking over one Dataset 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 Datasets, it is possible to manage the available GeoNode Maps through the Admin panel also.

Move to Admin > Maps to access the Maps list.

Notice that by enabling the Featured option here, will allow GeoNode to show the Map thumbnail and the Map detail link at the top under featured resources on the Home Page.
Batch Edit

Group
--------

Owner
--------

Category
--------

License
--------

Regions
--------

Date

Language
--------

Keywords

Cancel Submit

344 gordonstatistical_area_2_2010_generalised
statistical_area_2_2010_generalised
Nov. 19, 2021, 3:05 am.

342 gordonstatistical_area_2_2010_generalised
Arbresville
Nov. 19, 2021, 4:30 p.m.

Set permissions
94cf7e93de59e1e61e6de007d80d122172b_pl_1

Maps

Map layers +
Maps +
GeoNode Documentation, Release 3.2.1

1.24. GeoNode Admins Guide

Metadata uploaded preserve

Metadata xml:
```
<gmd:MD_Metadata xmlns:gmd="http://www.isotc211.org/2005/gmd"/>
```

Popular count: 2

Share count: 0

☑ Featured
Should this resource be advertised in home page?

☑ Is Published
Should this resource be published and searchable?

☑ Approved
Is this resource validated from a publisher or editor?

GeoNode
sharing geospatial data and maps.

Data  Maps  GeoStories  Dashboards  About  English
1.24.14 Manage the documents using the admin panel

Similarly to the Datasets 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.

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.

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 resource Edit Metadata and Advanced Metadata forms.

Note: When editing the resource metadata through the Edit Metadata, 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.
Fig. 256: Advanced Metadata Form
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.

Fig. 258: Hierarchical keywords list

Fig. 259: Hierarchical keywords edit
It is possible to force the user to select from a fixed list of keywords through the `FREE-TEXT_KEYWORDS_READONLY` setting.

When set to `True` keywords won’t be writable from users anymore. Only admins can will be able to manage them through the `Admin > Base > Hierarchical keywords` panel.

**Licenses**

Through the `Admin > Base > Licenses` panel it will be possible to manage all the licenses associated to the resources.

![Metadata editor Licenses](image)

**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.

![Resource Metadata Regions](image)

Fig. 261: Resource Metadata Regions

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 dataset. Those should be refined by the user dataset on anyway.

Metadata Restriction Code Types and Spatial Representation Types

Through the Admin > Base > Metadata Restriction Code Types and Admin > Base > Metadata Spatial Representation Types panels, it will be possible to update only the metadata descriptions for restrictions and spatial representation types.

Such lists are read-only by default since they have been associated to the specific codes of the ISO 19115 metadata schema. Changing them would require the system to provide a custom dictionary through the metadata catalog too. 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 registerd members) and whenever a user can hide the message or not and how long.

There are three types of announcements accordingly to their severity level: General, Warning and Critical The difference is mainly the color of the announcement box.

Only administrators and staff members can create and manage announcements.

Currently there two ways to access and manage the announcements list:

1. Via the GeoNode interface, from the Profile panel

   Note: Those are accessible by both admins and staff members.

2. Via the GeoNode Admin panel

   Note: Those are accessible by admins only.

The functionalities are almost the same for both the interfaces, except that from the Admin panel it is possible to manage the dismissals too.

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.
Fig. 263: Announcements from the Admin panel

Fig. 264: Announcements List from the Profile panel
Create Announcement

- Title
- Level: General
- Content
- Site wide
- Members only
- Dismissal type: Session Only Dismissal
- Publish end

Fig. 265: Create Announcement from the Profile panel
Fig. 266: *Create Announcement from the Admin panel*

Fig. 267: *Create Dismissal from the Admin panel*
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).

![GeoNode Top-Bar Menu customization](image)

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 custom placeholders already defined into the basic.html template, called CARDS_MENU, TOPBAR_MENU_RIGHT, TOPBAR_MENU_LEFT, TOPBAR_MENU.

From the Admin > Base panel, it is possible to access to the Menu, Menu Items and Menu Placeholder options.

The hierarchical structure of a custom Menu is the following one:

1. **Menu Placeholder**: first of all you need to define a placeholder both into the Admin > Base panel and the basic.html template, using the same keyword.

   By default GeoNode provides already defined menus.

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
   - A Menu Placeholder from the existing ones.
   - A Order in the case you’ll create more menus associated to the same placeholder.

   **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.
### Base

<table>
<thead>
<tr>
<th>Base</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>+</td>
</tr>
<tr>
<td>Contact roles</td>
<td>+</td>
</tr>
<tr>
<td>Curated thumbnails</td>
<td>+</td>
</tr>
<tr>
<td>Hierarchical keywords</td>
<td>+</td>
</tr>
<tr>
<td>Licenses</td>
<td>+</td>
</tr>
<tr>
<td>Links</td>
<td>+</td>
</tr>
<tr>
<td><strong>Menu items</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Menu placeholders</strong></td>
<td>+</td>
</tr>
<tr>
<td><strong>Menus</strong></td>
<td>+</td>
</tr>
<tr>
<td>Metadata Regions</td>
<td>+</td>
</tr>
<tr>
<td>Metadata Restriction Code Types</td>
<td></td>
</tr>
<tr>
<td>Metadata Spatial Representation Types</td>
<td></td>
</tr>
<tr>
<td>Metadata Topic Categories</td>
<td>+</td>
</tr>
<tr>
<td>Thesauri</td>
<td>+</td>
</tr>
<tr>
<td>Thesaurus Keyword Labels</td>
<td>+</td>
</tr>
<tr>
<td>Thesaurus Keywords</td>
<td>+</td>
</tr>
<tr>
<td>Thesaurus Labels</td>
<td>+</td>
</tr>
<tr>
<td>Celery Results</td>
<td></td>
</tr>
<tr>
<td>Group results</td>
<td>+</td>
</tr>
<tr>
<td>Task results</td>
<td>+</td>
</tr>
</tbody>
</table>

Fig. 269: *Menu, Menu Items and Menu Placeholder options on the Admin panel*
Fig. 270: The default `TOPBAR_MENU` Menu Placeholder on the Admin panel

Fig. 271: Create a new Menu from the Admin panel
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 more than one Menu Item. If you have 1 item, the item will be showed (but not under the menu).*

---

### 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_and_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.

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/ 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.:
Fig. 274: *Add a new `Access token`*

Fig. 275: *Create an `Access token`*
Fig. 276: Select a User

Fig. 277: Select a Token
### Add access token

<table>
<thead>
<tr>
<th>User</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source refresh token</td>
<td></td>
</tr>
<tr>
<td>Token</td>
<td>123456</td>
</tr>
<tr>
<td>Id token</td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>GeoServer</td>
</tr>
<tr>
<td>Expires</td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 278: Select the GeoServer Application**

<table>
<thead>
<tr>
<th>User</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source refresh token</td>
<td></td>
</tr>
<tr>
<td>Token</td>
<td>123456</td>
</tr>
<tr>
<td>Id token</td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>GeoServer</td>
</tr>
<tr>
<td>Expires</td>
<td>2022-01-04 11:00</td>
</tr>
<tr>
<td>Scope</td>
<td>write</td>
</tr>
</tbody>
</table>

**Fig. 279: Select the Token Expiration**

**Fig. 280: Select the Application Scope**
Notice the \texttt{access_token=123456} parameter at the end of the URL.

**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

Management commands are utility functions for GeoNode maintenance tasks. They are usually run from an SSH/bash shell on the server running GeoNode. Any call to python is prepended with a configuration parameter to indicate the GeoNode settings module to be used.

```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl --help
```

**Note:** If you have enabled \texttt{local_settings.py} the command will change as follows:

```bash
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py migrate_baseurl --help
```

#### 1.25.1 Migrate GeoNode Base URL

The \texttt{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 \textbf{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 \texttt{--help} option of the \texttt{migrate_baseurl} management command in order to inspect all the command options and features.

Run

```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl --help
```

This will produce output that looks like the following

```
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]
```

(continues on next page)
Migrate GeoNode VM Base URL

optional arguments:
-h, --help            show this help message and exit
--version            show program's version number and exit
-v {0,1,2,3}, --verbosity {0,1,2,3}
                      Verbosity level; 0=minimal output, 1=normal output,
                      2=verbose output, 3=very verbose output
--settings SETTINGS  The Python path to a settings module, e.g.
                      "myproject.settings.main". If this isn't provided, the
                      DJANGO_SETTINGS_MODULE environment variable will be
                      used.
--pythonpath PYTHONPATH     A directory to add to the Python path, e.g.
                        "/home/djangoprojects/myproject".
--traceback            Raise on CommandError exceptions
--no-color              Don't colorize the command output.
-f, --force             Forces the execution without asking for confirmation.
--source-address SOURCE_ADDRESS
                        Source Address (the one currently on DB e.g.
                        http://192.168.1.23)
--target-address TARGET_ADDRESS
                        Target Address (the one to be changed e.g. http://my-
                        public.geonode.org)

• Example 1: I want to move my GeoNode instance from http://127.0.0.1 to http://example.org

    Warning: Make always sure you are using the correct settings

    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

    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

    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 Datasets; those will be refreshed and synchronized with the GIS Server ones also
2. Metadata, Legend and Download links on Datasets and Maps
3. Cleanup Duplicated Links and Outdated Thumbnails

**Management Command sync_geonode_datasets**

This command allows to sync already existing permissions on Datasets. In order to change/set Datasets’ permissions refer to the section Batch Sync Permissions

The options are:

- **filter**: Only update data the Dataset names that match the given filter.
- **username**: Only update data owned by the specified username.
- **updatepermissions**: Update the Dataset permissions; synchronize it back to the GeoSpatial Server. This option is also available from the Layer Details page.
- **updateattributes**: Update the Dataset attributes; synchronize it back to the GeoSpatial Server. This option is also available from the Layer Details page.
- **updatethumbnails**: Update the Dataset thumbnail. This option is also available from the Layer Details page.
- **updatebbox**: Update the Dataset BBOX and LotLan BBOX. 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_datasets management command in order to inspect all the command options and features.

Run

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py sync_geonode_datasets --help
```

**Note:** If you enabled local_settings.py the command will change as following:

```
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py sync_geonode_datasets --help
```

This will produce output that looks like the following

```
usage: manage.py sync_geonode_datasets [-h] [--version] [-v {0,1,2,3}]
    [--settings SETTINGS]
    [--pythonpath PYTHONPATH] [--traceback]
    [--no-color] [-i] [-d] [-f FILTER]
```

(continues on next page)
Update the GeoNode Datasets: permissions (including GeoFence database), statistics, thumbnails

optional arguments:
-h, --help show this help message and exit
--version show program's version number and exit
-v {0,1,2,3}, --verbosity {0,1,2,3} Verbosity level; 0=minimal output, 1=normal output, 2=verbose output, 3=very verbose output
--settings SETTINGS The Python path to a settings module, e.g. "myproject.settings.main". If this isn't provided, the DJANGO_SETTINGS_MODULE environment variable will be used.
--pythonpath PYTHONPATH A directory to add to the Python path, e.g. "/home/djangoprojects/myproject".
--traceback Raise on CommandError exceptions
--no-color Don't colorize the command output.
-i, --ignore-errors Stop after any errors are encountered.
-d, --remove-duplicates Remove duplicates first.
-f FILTER, --filter FILTER Only update data the Datasets that match the given filter.
-u USERNAME, --username USERNAME Only update data owned by the specified username.
--updatepermissions Update the Dataset permissions.
--updatethumbnails Update the Dataset styles and thumbnails.
--updateattributes Update the Dataset attributes.
--updatebbox Update the Dataset BBOX.

• Example 1: I want to update/sync all Datasets 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_datasets --updatepermissions --updateattributes
```

• Example 2: I want to regenerate the Thumbnails of all the Datasets belonging to afabiani

```
Warning: Make always sure you are using the correct settings
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py sync_geonode_datasets -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

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py sync_geonode_maps --help
```

**Note:** If you enabled `local_settings.py` the command will change as following:

```
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py sync_geonode_maps --help
```

This will produce output that looks like the following

```
usage: manage.py sync_geonode_maps [-h] [--version] [-v {0,1,2,3}] [-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
```

Update the GeoNode maps: permissions, thumbnails

(continues on next page)
Only update data the maps that match the given filter.

- `USERNAME`, `--username` `USERNAME`

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
  ```

  ```
  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 Datasets. The command will also update the **CSW Catalogue XML** and Links of GeoNode.

The options are:

- `filter`; Only update data the Datasets 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.

- `set-uuid`; will refresh the UUID based on the UUID_HANDLER if configured (Default False).

- `set_attrib`; If set will refresh the attributes of the resource taken from Geoserver. (Default True).

- `set_links`; If set will refresh the links of the resource. (Default True).

First of all let’s take a look at the `--help` option of the set_all_layers_metadata management command in order to inspect all the command options and features.

Run

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py set_all_layers_metadata --help
```

**Note:** If you enabled `local_settings.py` the command will change as following:

```
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py set_all_layers_metadata --help
```

This will produce output that looks like the following

Resets Metadata Attributes and Schema to All Datasets

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.
-t, --delete-orphaned-thumbs Delete Orphaned Thumbnails.
-f FILTER, --filter FILTER Only update data the Datasets that match the given filter
-u USERNAME, --username USERNAME Only update data owned by the specified username

• Example 1: After having changed the Base URL, I want to regenerate all the Catalogue Schema and eventually remove all duplicates.

Warning: Make always sure you are using the correct settings

DJANGO_SETTINGS_MODULE=geonode.settings python manage.py set_all_layers_metadata -d

1.25. GeoNode Management Commands
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 Datasets to GeoNode via the web interface. For instance:

- The dataset is too big to be uploaded through a web interface.
- Import data from a mass storage programmmatically.
- Import tables from a database.

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.geoserver* Django app includes 2 management commands that you can use to load 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

```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py importlayers --help
```

**Note:** If you enabled *local_settings.py* the command will change as following:

```bash
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] [-hh HOST] [-u USERNAME] [-p PASSWORD]
                             [-v {0,1,2,3}] [--settings SETTINGS]
                             [--pythonpath PYTHONPATH] [-t] [--traceback] [--no-color]
                             [--force-color] [--skip-checks]
                             [path [path ...]]

Brings files from a local directory, including subfolders, into a GeoNode site. The datasets are added to the Django database, the GeoServer configuration, and the pycsw metadata index. At this moment only files of type Esri Shapefile (.shp) and GeoTiff (.tif) are supported.
```

In order to perform the import, GeoNode must be up and running.

Positional arguments:

- **path**  path [path...]

Optional arguments:

- **-h, --help**  show this help message and exit

(continues on next page)
- `--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".
- `-hh HOST, --host HOST` Geonode host url
- `-u USERNAME, --username USERNAME` Geonode username
- `-p PASSWORD, --password PASSWORD` Geonode password

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 `-hh` Identifies the GeoNode server where we want to upload our Datasets. The default value is `http://localhost:8000`.
- The `-u` Identifies the username for the login. The default value is `admin`.
- The `-p` Identifies the password for the login. The default value is `admin`.

The import Datasets management command is invoked by specifying options as described above and specifying the path to a directory that contains multiple files. For purposes of this exercise, let's use the default set of testing Datasets that ship with geonode. You can replace this path with a directory to your own shapefiles.

This command will produce the following output to your terminal

```
san_andres_y_providencia_poi.shp: 201
san_andres_y_providencia_location.shp: 201
san_andres_y_providencia_administrative.shp: 201
san_andres_y_providencia_coastline.shp: 201
san_andres_y_providencia_highway.shp: 201
single_point.shp: 201
san_andres_y_providencia_water.shp: 201
san_andres_y_providencia_natural.shp: 201
```

1.7456605294117646 seconds per Dataset

Output data: {
  "success": [
    "san_andres_y_providencia_poi.shp",
    "san_andres_y_providencia_location.shp",
    "san_andres_y_providencia_administrative.shp",
    "san_andres_y_providencia_coastline.shp",
    "san_andres_y_providencia_highway.shp",
    "single_point.shp",
    "san_andres_y_providencia_water.shp",
    "san_andres_y_providencia_natural.shp"
  ]
}
As output the command will print:

The status code, is the response coming from GeoNode. For example 201 means that the Dataset has been correctly uploaded.

If you encounter errors while running this command, please check the GeoNode logs for more information.

**Management Command `updatelayers`**

While it is possible to import Datasets directly from your server's 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, some of them may not be supported as GeoNode upload formats. You can add them to your GeoNode by following the procedure described below.

GeoServer supports 4 types of data: **Raster**, **Vector**, **Databases** and **Cascaded**.

For a list of the supported formats for each type of data, consult the following pages:

- [https://docs.geoserver.org/latest/en/user/data/raster/index.html](https://docs.geoserver.org/latest/en/user/data/raster/index.html)
- [https://docs.geoserver.org/latest/en/user/data/cascaded/index.html](https://docs.geoserver.org/latest/en/user/data/cascaded/index.html)

**Note:** Some of these raster or vector formats or database types require that you install specific plugins in your GeoServer in order to use them. Please consult the GeoServer documentation for more information.

**Data from a PostGIS database**

Let's walk through an example of configuring a new PostGIS database in GeoServer and then configuring those Datasets in your GeoNode.

First visit the GeoServer administration interface on your server. This is usually on port 8080 and is available at [http://localhost:8080/geoserver/web/](http://localhost:8080/geoserver/web/)

1. You should login with the superuser credentials you setup when you first configured your GeoNode instance. Once you are logged in to the GeoServer Admin interface, you should see the following.

   **Note:** The number of stores, Datasets and workspaces may be different depending on what you already have configured in your GeoServer.

2. Next you want to select the “Stores” option in the left hand menu, and then the “Add new Store” option. The following screen will be displayed.
1.25. GeoNode Management Commands
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 Datasets in your database. This will of course be different depending on the Datasets in your database.

5. Select the “Publish” button for one of the Datasets and the next screen will be displayed where you can enter metadata for this Dataset. 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 Dataset will now be configured for use in your GeoServer.

8. The next step is to configure these Datasets in GeoNode. The `updatelayers` management command can be used for this purpose. As with `importlayers`, it’s useful to look at the command line options for this command by passing the `--help` option.

   Run

   ```
   DJANGO_SETTINGS_MODULE=geonode.settings python manage.py updatelayers --help
   ```

   **Note:** If you enabled `local_settings.py` the command will change as following:

   ```
   DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py updatelayers --help
   ```
1.25. GeoNode Management Commands
This will produce output that looks like the following

```
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.
  -i, --ignore-errors    Stop after any errors are encountered.
  --skip-unadvertised    Skip processing unadvertised Datasets from GeoSever.
  --skip-geonode-registered
                        Just processing GeoServer Datasets still not in GeoNode.
  --remove-deleted       Remove GeoNode Datasets that have been deleted from
                        GeoSever.
  -u USER, --user USER   Name of the user account which should own the
                        imported Datasets
  -f FILTER, --filter FILTER
                        Only update data the Datasets that match the given filter
  -s STORE, --store STORE Only update data the Datasets for the given
                        geoserver store name
  -w WORKSPACE, --workspace WORKSPACE
                        Only update data on specified workspace
  -p PERMISSIONS, --permissions PERMISSIONS
                        Permissions to apply to each Dataset
```

The update procedure includes the following steps:
• The process fetches from GeoServer the relevant WMS layers (all, by store or by workspace)
• If a filter is defined, the GeoServer layers are filtered
• For each of the layers, a GeoNode dataset is created based on the metadata registered on GeoServer (title, abstract, bounds)
• New layers are added, existing layers are replaced, unless the --skip-geonode-registered option is used
• The GeoNode layers, added in previous runs of the update process, which are no longer available in GeoServer are removed, if the --remove-delete option is set

**Warning:** One of the --workspace or --store must be always specified if you want to ingest Datasets belonging to a specific Workspace. As an instance, in order to ingest the Datasets present into the geonode workspace, you will need to specify the option --w geonode.

9. Let’s ingest the Dataset geonode:_1_SARMIENTO_ENERO_2018 from the geonode workspace.

    DJANGO_SETTINGS_MODULE=geonode.settings python manage.py updatelayers -w geonode -f _1_SARMIENTO_ENERO_2018

    Inspecting the available Datasets in GeoServer ...
    Found 1 Datasets, starting processing
    /usr/local/lib/python2.7/site-packages/owslib/iso.py:117: 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)
    /usr/local/lib/python2.7/site-packages/owslib/iso.py:495: FutureWarning:
    ⚠️ The .keywords and .keywords2 properties will merge into the .keywords
    ⚠️ property in the future, with .keywords becoming a list of MD_Keywords
    ⚠️ instances. This is currently implemented in .keywords2. Please see
    ⚠️ https://github.com/geopython/OWSLib/issues/301 for more information
    FutureWarning)
    Content-Type: text/html; charset="utf-8"
    MIME-Version: 1.0
    Content-Transfer-Encoding: 7bit
    Subject: [master.demo.geonode.org] A new Dataset has been uploaded
    From: webmaster@localhost
    To: mapadeldelito@chubut.gov.ar
    Reply-To: webmaster@localhost
    Date: Tue, 08 Oct 2019 12:26:17 -0000
    Message-ID: <20191008122617.28801.94967@d3cf85425231>

    <body>
    You have received the following notice from master.demo.geonode.org:
    <p>
    The user <i><a href="http://master.demo.geonode.org/people/profile/admin">admin</a></i> uploaded the following Dataset:<br/>
    <strong>_1_SARMIENTO_ENERO_2018</strong><br/>
    You can visit the Dataset’s detail page here: http://master.demo.geonode.org/Datasets/geonode:_1_SARMIENTO_ENERO_2018
    <br/>
    </p>
    (continues on next page)
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 Dataset:<br/>

You can visit the Dataset's detail page here: http://master.demo.geonode.org/Datasets/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:
<p>
The user <i><a href="http://master.demo.geonode.org/people/profile/admin">
˓→admin</a></i> uploaded the following Dataset:<br/>
<i><strong>_1_SARMIENTO_ENERO_2018</strong></i><br/>
You can visit the Dataset's detail page here: http://master.demo.geonode.
˓→org/Datasets/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 Dataset: _1_SARMIENTO_ENERO_2018
... Creating Default Resource Links for Layer [geonode:_1_SARMIENTO_ENERO_ 
˓→2018]
-- Resource Links[Prune old links]...
-- Resource Links[Prune old links]...done!
-- Resource Links[Compute parameters for the new links]...
-- Resource Links[Create Raw Data download link]...
-- Resource Links[Create Raw Data download link]...done!
-- Resource Links[Set download links for WMS, WCS or WFS and KML]...
-- Resource Links[Set download links for WMS, WCS or WFS and KML]...done!
-- Resource Links[Legend link]...
-- Resource Links[Legend link]...done!
-- Resource Links[Thumbnail link]...
-- Resource Links[Thumbnail link]...done!
-- Resource Links[OWS Links]...
-- Resource Links[OWS Links]...done!
Content-Type: text/html; charset="utf-8"
MIME-Version: 1.0
Content-Transfer-Encoding: 7bit
Subject: [master.demo.geonode.org] A Dataset 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 Dataset was updated:<br/>
<i><strong>_1_SARMIENTO_ENERO_2018</strong></i>, owned by <i><a href="http://
˓→master.demo.geonode.org/people/profile/admin">
˓→admin</a></i></p>
You can visit the Dataset's detail page here: http://master.demo.geonode.org/Datasets/geonode:_1_SARMIENTO_ENERO_2018

To change how you receive notifications, please go to http://master.demo.geonode.org
You have received the following notice from master.demo.geonode.org:

The following Dataset was updated:<br/>
<strong>_1_SARMIENTO_ENERO_2018</strong>, owned by <i><a href="http://master.demo.geonode.org/people/profile/admin">admin</a></i><br/>
You can visit the Dataset's detail page here: http://master.demo.geonode.org/Datasets/geonode:_1_SARMIENTO_ENERO_2018

To change how you receive notifications, please go to http://master.demo.geonode.org

---

Found geoserver resource for this Dataset: _1_SARMIENTO_ENERO_2018
/usr/local/lib/python2.7/site-packages/geoserver/style.py:80:<br/>
FutureWarning: The behavior of this method will change in future versions. Use specific 'len(elem)' or 'elem is not None' test instead.
if not user_style:
/usr/local/lib/python2.7/site-packages/geoserver/style.py:84:<br/>
FutureWarning: The behavior of this method will change in future versions. Use specific 'len(elem)' or 'elem is not None' test instead.
if user_style:
... Creating Default Resource Links for Layer [geonode:_1_SARMIENTO_ENERO_2018]
-- Resource Links[Prune old links]...
-- Resource Links[Prune old links]...done!
-- Resource Links[Compute parameters for the new links]...
-- Resource Links[Create Raw Data download link]...
-- Resource Links[Create Raw Data download link]...done!
-- Resource Links[Set download links for WMS, WCS or WFS and KML]...
-- Resource Links[Set download links for WMS, WCS or WFS and KML]...done!
-- Resource Links[Legend link]...
-- Resource Links[Legend link]...done!
-- Resource Links[Thumbnail link]...
-- Resource Links[Thumbnail link]...done!
-- Resource Links[OWS Links]...
-- Resource Links[OWS Links]...done!
[created] Layer _1_SARMIENTO_ENERO_2018 (1/1)

Finished processing 1 Datasets in 5.0 seconds.

1 Created Datasets
0 Updated Datasets
0 Failed Datasets
Note: In case you don’t specify the -f option, the Datasets that already exists in your GeoNode will be just updated and the configuration synchronized between GeoServer and GeoNode.

Warning: When updating from GeoServer, the configuration on GeoNode will be changed!

**Using GDAL and OGR to convert your Data for use in GeoNode**

GeoNode supports uploading data in *ESRI shapefiles, GeoTIFF, CSV, GeoJSON, ASCII-GRID* and *KML/KMZ* formats (for the last three formats only if you are using the *geonode.importer* backend).

- If your data is in other formats, you will need to convert it into one of these formats for use in GeoNode.
- If your *Raster* data is not correctly processed, it might be almost unusable with GeoServer and GeoNode. You will need to process it using *GDAL*.

You need to make sure that you have the GDAL library installed on your system. On Ubuntu you can install this package with the following command:

```
sudo apt-get install gdal-bin
```

**OGR (Vector Data)**

OGR is used to manipulate vector data. In this example, we will use MapInfo .tab files and convert them to shapefiles with the ogr2ogr command. We will use sample MapInfo files from the website linked below.


You can download the Admin;(Postcode) Dataset by issuing the following command:

```
```

You will need to unzip this dataset by issuing the following command:

```
$ unzip admin_postcode_vm.zip
```

This will leave you with the following files in the directory where you executed the above commands:

```
|-- ANZVI08030303025.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
```

(continues on next page)
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",
        DATUM["GDA94",
            SPHEROID["GRS 80",6378137.298.257222101],
            TOWGS84[0,0,0,-0,-0,-0,0]],
        PRIMEM["Greenwich",0],
        UNIT["degree",0.0174532925199433]],
    PROJECTION["Lambert_Conformal_Conic_2SP"],
    PARAMETER["standard_parallel_1",-36],
    PARAMETER["standard_parallel_2",-38],
    PARAMETER["latitude_of_origin",-37],
    PARAMETER["central_meridian",145],
    PARAMETER["false_easting",2500000],
    PARAMETER["false_northing",2500000],
    UNIT["Meter",1]]
PFI: String (10.0)
POSTCODE: String (4.0)
FEATURE_TYPE: String (6.0)
FEATURE_QUALITY_ID: String (20.0)
PFI_CREATED: Date (10.0)
UFI: Real (12.0)
UFI_CREATED: Date (10.0)
UFI_OLD: Real (12.0)
```

This gives you information about the number of features, the extent, the projection and the attributes of this Dataset.

Next, let's go ahead and convert this Dataset into a shapefile by issuing the following command:

```bash
$ 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 Dataset to the WGS84 spatial reference system with the -t_srs ogr2ogr option. The output of this command will look like the following:
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:

```plaintext
INFO: Open of `postcode_polygon.shp'
       using driver `ESRI Shapefile' successful.
Layer name: postcode_polygon
Geometry: Polygon
Feature Count: 26
Extent: (144.030296, -37.898156) - (145.101137, -36.888878)
Layer SRS WKT:
GEOGCS["GCS_WGS_1984",
    DATUM["WGS_1984",
        SPHEROID["WGS_84",6378137,298.257223563]],
    PRIMEM["Greenwich",0],
    UNIT["Degree",0.017453292519943295]]
PFI: String (10.0)
POSTCODE: String (4.0)
FEATURE_TY: String (6.0)
FEATURE_QU: String (20.0)
PFI_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 Dataset info page (“Layer Info” button), or to edit the metadata for that Dataset (“Edit Metadata” button), or to manage the styles for that Dataset (“Manage Styles”).
1.25. GeoNode Management Commands
GDAL (Raster Data)

Let's see several examples on how to either convert raster data into different formats and/or process it to get the best performances.

References:
   a) https://geoserver.geo-solutions.it/edu/en/raster_data/processing.html
   b) https://geoserver.geo-solutions.it/edu/en/raster_data/advanced_gdal/

Raster Data Conversion: Arc/Info Binary and ASCII Grid data into GeoTIFF format.

Let's assume we have a sample ASCII Grid file compressed as an archive.

```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:
And this should be the corresponding output:

Driver: AIG/Arc/Info Binary Grid
Files: batemans_ele
    batemans_ele/dblbnd.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","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",1000000],
            UNIT["METERS",1]]
    Origin = (239681.000000000000000,6050551.000000000000000)
    Pixel Size = (100.000000000000000,-100.000000000000000)
Corner Coordinates:
    Upper Left ( 239681.000, 6050551.000) (150d 7'28.35"E, 35d39'16.56"S)
    Lower Left ( 239681.000, 6036351.000) (150d 7'11.78"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=-3.402823463852886e+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_orhoto_optimized` public raster Dataset which is currently available on the Thai CHIANG MAI Urban Flooding GeoNode platform.

This dataset contains an orthorectified image stored as RGBA GeoTiff with 4 bands, three bands for the RGB and one for transparency (the alpha channel).

Calling the gdalinfo command to see detailed information:

```
gdalinfo chiangMai_orhoto.tif
```

It will produce the following results:
Driver: GTiff/GeoTIFF
Files: chiangMai_ortho.tif
Size is 63203, 66211
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
  GEOGCS["WGS 84",
    DATUM["WGS_1984",
      SPHEROID["WGS 84",6378137,298.257223563,
        AUTHORITY["EPSG","7030"],
        AUTHORITY["EPSG","6326"],
        PRIMEM["Greenwich",0,
          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, 2055593.702) ( 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, 2055593.702) ( 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 perfor-
mances.

Let’s take a look at the gdal_translate command used to optimize our GeoTiff:

```
gdal_translate -co TILED=YES -co COMPRESS=JPEG -co PHOTOMETRIC=YCBCR
--config GDAL_TIFF_INTERNAL_MASK YES -b 1 -b 2 -b 3 -mask 4
chiangMai_ortho.tif
chiangMai_ortho_optimized.tif
```

**Note:** For the details about the command parameters see https://geoserver.geo-solutions.it/edu/en/raster_data/
advanced_gdal/example5.html

Once the process ended, call the gdalinfo command on the resulting tif file:

```
gdalinfo chiangMai_ortho_optimized.tif
```

The following should be the results:

```
Driver: GTiff/GeoTIFF
Files: chiangMai_ortho_optimized.tif
Size is 63203, 66211
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
  GEOGCS["WGS 84"],
  DATUM["WGS_1984"],
```

(continues on next page)
Our GeoTiff is now tiled with 256x256 tiles, has 3 bands and a 1-bit mask for no data.

We can also add internal overviews to the file using the gdaladdo command:

```
gdaladdo -r average chiangMai_ortho_optimized.tif 2 4 8 16 32 64 128 256 512
```

Overviews are duplicate versions of your original data, but resampled to a lower resolution, they can also be compressed with various algorithms, much in the same way as the original dataset.

By default, overviews take the same compression type and transparency masks of the input dataset (applied through

---

**1.25. GeoNode Management Commands**
the gdal_translate command), so the parameters to be specified are:

- `-r average`: computes the average of all non-NODATA contributing pixels
- `2 4 8 16 32 64 128 256 512`: the list of integral overview levels to build (from gdal version 2.3 levels are no longer required to build overviews)

Calling the gdalinfo command again:

```
gdalinfo chiangMai_ortho_optimized.tif
```

It results in:

```
Driver: GTiff/GeoTIFF
Files: chiangMai_ortho_optimized.tif
Size is 63203, 66211
Coordinate System is:
PROJCS[
"WGS 84 / UTM zone 47N",
GEOGCS[
"WGS 84",
DATUM[
"WGS_1984",
SPHEROID[
"WGS 84", 6378137.298257223563, 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"]]
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NoData Value=-10000
Overviews: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Mask Flags: PER_DATASET
Overviews of mask band: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Band 2 Block=256x256 Type=Byte, ColorInterp=Green
NoData Value=-10000
Overviews: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Mask Flags: PER_DATASET
Overviews of mask band: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Band 3 Block=256x256 Type=Byte, ColorInterp=Blue
NoData Value=-10000
Overviews: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130
Mask Flags: PER_DATASET
Overviews of mask band: 31602x33106, 15801x16553, 7901x8277, 3951x4139, 1976x2070, 988x1035, 494x518, 247x259, 124x130

Notice that the transparency masks of internal overviews have been applied (their compression does not show up in the file metadata).

UAVs usually provide also two other types of data: DTM (Digital Terrain Model) and DSM (Digital Surface Model).

Those data require different processes to be optimized. Let’s look at some examples to better understand how to use gdal to accomplish that task.

From the CHIANG MAI Urban Flooding GeoNode platform it is currently available the `chiangMai_dtm_optimized` Dataset, 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"]],
    AUTHORITY["EPSG","6326"]],
  AUTHORITY["EPSG","8901"]],
PRIMEM["Greenwich",0,
  AUTHORITY["EPSG","8901"]],
UNIT["degree",0.0174532925199433,
  AUTHORITY["EPSG","9122"]],
```

(continues on next page)
AUTHORITY["EPSG","4326"],
PROJECTION["Transverse_Mercator"],
PARAMETER["latitude_of_origin",0],
PARAMETER["central_meridian",99],
PARAMETER["scale_factor",0.9996],
PARAMETER["false_easting",500000],
PARAMETER["false_northing",0],
UNIT["metre",1,
   AUTHORITY["EPSG","9001"],
AXIS["Easting",EAST],
AXIS["Northing",NORTH],
AUTHORITY["EPSG","32647"]
Origin = (487068.774750000040513,2057413.889810000080615)
Pixel Size = (0.144270000000000,-0.144270000000000)
Metadata:
AREA_OR_POINT=Area
TIFFTAG_SOFTWARE=pix4dmapper
Image Structure Metadata:
COMPRESSION=LZW
INTERLEAVE=BAND
Corner Coordinates:
Upper Left ( 487068.775, 2057413.890) ( 98d52'38.72"E, 18d36'27.34"N)
Lower Left ( 487068.775, 2055503.755) ( 98d52'38.77"E, 18d35'25.19"N)
Upper Right ( 488892.059, 2057413.890) ( 98d53'40.94"E, 18d36'27.37"N)
Lower Right ( 488892.059, 2055503.755) ( 98d53'40.98"E, 18d35'25.22"N)
Center ( 487980.417, 2056458.822) ( 98d53' 9.85"E, 18d35'56.28"N)
Band 1 Block=12638x1 Type=Float32, ColorInterp=Gray
NoData Value=-10000

Reading this image could be very slow because it has not been tiled yet. So, as discussed above, its data need to be stored and compressed in tiles to increase performances.

The following gdal_translate command should be appropriate for that purpose:

```bash
gdal_translate -co TILED=YES -co COMPRESS=DEFLATE chiangMai_dtm.tif chiangMai_dtm_optimized.tif
```

When the data to compress consists of imagery (es. aerial photographs, true-color satellite images, or colored maps) you can use lossy algorithms such as JPEG. We are now compressing data where the precision is important, the band data type is Float32 and elevation values should not be altered, so a lossy algorithm such as JPEG is not suitable. JPEG should generally only be used with Byte data (8 bit per channel) so we have choosen the lossless DEFLATE compression through the COMPRESS=DEFLATE creation option.

Calling the gdalinfo command again:

```bash
gdalinfo chiangMai_dtm_optimized.tif
```

We can observe the following results:

Driver: GTiff/GeoTIFF
Files: chiangMai_dtm_optimized.tif
Size is 12638, 13240
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",]
GEOGCS["WGS 84",
   DATUM["WGS_1984",
      SPHEROID["WGS 84",6378137.295,298.257223563,
         AUTHORITY["EPSG","7030"]],
      AUTHORITY["EPSG","6269"]],
   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 = (487068.775,2057413.890)
Pixel Size = (0.144270000000000,-0.144270000000000)
Metadata:
AREA_OR_POINT=Area
TIFFTAG_SOFTWARE=pix4dmapper
Image Structure Metadata:
COMPRESSION=DEFLATE
INTERLEAVE=BAND
Corner Coordinates:
Upper Left ( 487068.775, 2057413.890) ( 98d52'38.72"E, 18d36'27.34"N)
Lower Left ( 487068.775, 2055503.755) ( 98d52'38.77"E, 18d35'25.19"N)
Upper Right ( 488892.059, 2057413.890) ( 98d53'40.94"E, 18d36'27.37"N)
Lower Right ( 488892.059, 2055503.755) ( 98d53'40.98"E, 18d35'25.22"N)
Center ( 487980.417, 2056458.822) ( 98d53'9.85"E, 18d35'56.28"N)
Band 1 Block=256x256 Type=Float32, ColorInterp=Gray
NoData Value=-10000

We need also to create overviews through the gdaladdo command:

```
gdaladdo -r nearest chiangMai_dtm_optimized.tif 2 4 8 16 32 64
```

Unlike the previous example, overviews will be created with the **nearest resampling algorithm**. That is due to the nature of the data we are representing: we should not consider the average between two elevation values but simply the closer one, it is more reliable regarding the conservation of the original data.

Calling the gdalinfo command again:

```
gdalinfo chiangMai_dtm_optimized.tif
```

We can see the following information:
Driver: GTiff/GeoTIFF
Files: chiangMai_dtm_optimized.tif
Size is 12638, 13240
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
    GEOGCS["WGS 84",
        DATUM["WGS_1984",
            SPHEROID["WGS 84",6378137,298.257223563,
                AUTHORITY["EPSG","7030"],
                AUTHORITY["EPSG","6326"],
            PRIMEM["Greenwich",0,
                AUTHORITY["EPSG","8901"],
            UNIT["degree",0.0174532925199433,
                AUTHORITY["EPSG","9122"],
                AUTHORITY["EPSG","4326"],
            PROJECTION["Transverse_Mercator"],
            PARAMETER["latitude_of_origin",0],
            PARAMETER["central_meridian",99],
            PARAMETER["scale_factor",0.9996],
            PARAMETER["false_easting",500000],
            PARAMETER["false_northing",0],
            UNIT["metre",1,
                AUTHORITY["EPSG","9001"],
            AXIS["Easting",EAST],
            AXIS["Northing",NORTH],
            AUTHORITY["EPSG","32647"]]
        ORIGIN = (487068.774750000040513,2057413.889810000080615)
        Pixel Size = (0.144270000000000,-0.144270000000000)
        Metadata:
        AREA_OR_POINT=Area
        TIFFTAG_SOFTWARE=pix4dmapper
        Image Structure Metadata:
        COMPRESSION=DEFLATE
        INTERLEAVE=BAND
        Corner Coordinates:
        Upper Left ( 487068.775, 2057413.890) ( 98d52'38.72"E, 18d36'27.34"N)
        Lower Left ( 487068.775, 2055503.755) ( 98d52'38.77"E, 18d35'25.19"N)
        Upper Right ( 488892.059, 2057413.890) ( 98d53'40.94"E, 18d36'27.37"N)
        Lower Right ( 488892.059, 2055503.755) ( 98d53'40.98"E, 18d35'25.22"N)
        Center ( 487980.417, 2056458.822) ( 98d53' 9.85"E, 18d35'56.28"N)
        Band 1 Block=256x256 Type=Float32, ColorInterp=Gray
        NoData Value=-10000
        Overviews: 6319x6620, 3160x3310, 1580x1655, 790x828, 395x414, 198x207

Overviews have been created. By default, they inherit the same compression type of the original dataset (there is no evidence of it in the gdalinfo output).
Other Raster Data Use Cases

- Serving a large number of GrayScale GeoTiff with Palette
- Serving a large number of DTM ASCII Grid Files
- Serving a large number of Cartographic Black/White GeoTiff with Palette
- Serving a large number of satellite/aerial RGB GeoTiff with compression
- Optimizing and serving UAV data
- Optimizing and serving 16-bits satellite/aerial RGB GeoTiff

Process Raster Datasets Programmatically

In this section we will provide a set of shell scripts which might be very useful to batch process a lot of raster datasets programmatically.

1. process_gray.sh

```bash
for filename in *.tif; do
echo gdal_translate -co TILED=YES -co COMPRESS=DEFLATE $filename ${filename//.tif/.optimized.tif}; done > gdal_translate.sh
chmod +x gdal_translate.sh
./gdal_translate.sh
```

2. process_rgb.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\" /.tif/"; done > rename.sh
chmod +x *.sh
./gdaladdo.sh
./rename.sh
```

3. process_rgb_alpha.sh

```bash
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\" /.tif/"; done > rename.sh
chmod +x *.sh
./gdaladdo.sh
./rename.sh
```
for filename in *.tif*; do echo gdal_translate -co TILED=YES -co,
"COMPRESS=YES -co PHOTOMETRIC=YCBCR --config GDAL_TIFF_INTERNAL_MASK YES,
-b 1 -b 2 -b 3 -mask 4 $filename ${filename//.tif/.optimized.tif}; done >
gdal_translate.sh
chmod +x gdal_translate.sh
./gdal_translate.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

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

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

1.25.4 Thesaurus Import and Export

See Import via the load_thesaurus command and Exporting a thesaurus as RDF via the dump_thesaurus command.

1.25.5 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, Datasets, permission and more. To learn more detailed about this interface check this LINK. For now it will be enough to just follow the steps. To attend the Django Admin Interface, go to your geonode website and sign in with your_superuser. Once you’ve logged in, the name of your user will appear on the top right. Click on it and the following menu will show up:

Menu

- Upload Layers
- Profile
- Recent Activity
- Inbox
- Announcements
- Remote Services
- Invite User
- GeoServer
- Admin
- Help

Clicking on Admin causes the interface to show up.

Go to Auth -> Users and you will see all the users that exist at the moment. In your case it will only be your_superuser. Click on it, and you will see a section on Personal Info, one on Permissions and one on Important dates. For the 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.
## Django administration

### Site administration

<table>
<thead>
<tr>
<th>Section</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Account</strong></td>
<td>Add</td>
</tr>
<tr>
<td>Account deletions</td>
<td>Add</td>
</tr>
<tr>
<td>Accounts</td>
<td>Add</td>
</tr>
<tr>
<td>Signup codes</td>
<td>Add</td>
</tr>
<tr>
<td><strong>Actstream</strong></td>
<td>Add</td>
</tr>
<tr>
<td>Actions</td>
<td>Add</td>
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<tr>
<td>Follows</td>
<td>Add</td>
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<tr>
<td><strong>Announcements</strong></td>
<td>Add</td>
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<td>Announcements</td>
<td>Add</td>
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<tr>
<td>Dismissals</td>
<td>Add</td>
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<tr>
<td><strong>Auth</strong></td>
<td>Add</td>
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<tr>
<td>Groups</td>
<td>Add</td>
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<tr>
<td>Users</td>
<td>Add</td>
</tr>
<tr>
<td><strong>Avatar</strong></td>
<td>Add</td>
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<tr>
<td>Avatars</td>
<td>Add</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>Add</td>
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<tr>
<td>Contact roles</td>
<td>Add</td>
</tr>
<tr>
<td>Links</td>
<td>Add</td>
</tr>
<tr>
<td>Metadata Regions</td>
<td>Add</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.
and would not be able to access the Django Admin Interface (which is only available for users with the staff status). Therefore keep the following two things in mind:

- a superuser is able to access the Django Admin Interface and he has all permissions on the data uploaded to GeoNode.
- an ordinary user (created from the GeoNode interface) only has active permissions by default. The user will not have the ability to access the Django Admin Interface and certain permissions have to be added for him.

Until now we’ve only created superusers. So how do you create an ordinary user? You have two options:

1. Django Admin Interface

First we will create a user via the Django Admin Interface because we’ve still got it open. Therefore go back to Auth -> Users and you should find a button on the right that says Add user.

Click on it and a form to fill out will appear. Name the new user test_user, choose a password and click save at the right bottom of the site.

Now you should be directed to the site where you could change the permissions on the user test_user. As default only active is checked. If you want this user also to be able to attend this admin interface you could also check staff status. But for now we leave the settings as they are!

To test whether the new user was successfully created, go back to the GeoNode web page and try to sign in.

2. GeoNode website

To create an ordinary user you could also just use the GeoNode website. If you installed GeoNode using a release, you should see a Register button on the top, beside the Sign in button (you might have to log out before).

Hit the button and again a form will appear for you to fill out. This user will be named geonode_user

By hitting Sign up the user will be signed up, as default only with the status active.
1.25.6 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 Datasets.

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** (Datasets) which permissions will be assigned on → type the Dataset 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 Datasets 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 Datasets *layer_X* and *Dataset 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 'Dataset Y'
   ```

2. Assign **owner** permissions on all the Datasets to the group **group_C**.

   ```
   python manage.py set_layers-permissions -p owner -g group_C
   ```

3. Unset **download** permissions on the Dataset *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 >> Datasets*.

An action named **Set Datasets permissions** is available from the list, redirecting the administrator to a form to set / unset read, write, download and ownership permissions on the selected Datasets.
1.25.7 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:

```
```

(continues on next page)
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 ...
  --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 (Datasets, 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 Dataset, 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/3.2/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 Datasets with ID’s 1, 2, and 3, those owned by admin user, along with all defined maps.

```json
{
    "filters": {
        "Dataset": [
            "Q(pk__in=[1, 2, 3]) | Q(title__icontains='italy')",
            "Q(user__name=admin)"
        ],
        "map": ["*"]
    }
}
```

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.Dataset, 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 Datasets 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")' 'Q(owner__name=admin)' -m '*'
```

1.25.8 Async execution over http

It is possible to expose and run management commands over http.

To run custom django management commands usually we make make use of the command line:

```bash
python manage.py ping_mngmt_commands_http
$> pong
```

The management_commands_http app allows us to run commands when we have no access to the command line. It’s possible to run a command using the API or the django admin GUI.

For security reasons, only admin users can access the feature and the desired command needs to be explicitly exposed. By default the following commands are exposed: ping_mngmt_commands_http, updatelayers, sync_geonode_datasets, sync_geonode_maps, importlayers and set_all_datasets_metadata.

To expose more command you can change the environment variable MANAGEMENT_COMMANDS_EXPOSED_OVER_HTTP and the added commands will be exposed in your application.
The list of exposed commands is available by the endpoint `list_management_commands` and also presented by the form in the admin page `create management command job`.

**Note:** To use the commands in an asynchronous approach `ASYNC_SIGNALS` needs to be set to `True` and celery should be running.

### Manage using django admin interface

#### Creating a job

Access the admin panel: http://<your_geonode_host>/admin and go to “Management command jobs”.

![Management command admin section](http://<your_geonode_host>/en/admin/management_commands_http/managementcommandjob/)

You will arrive at http://<your_geonode_host>/en/admin/management_commands_http/managementcommandjob/, then click on the button + Add management command job (http://<your_geonode_host>/en/admin/management_commands_http/managementcommandjob/add/).

![Add management command job](http://<your_geonode_host>/en/admin/management_commands_http/managementcommandjob/add/)

Select the command and fill the form, with the arguments and/or key-arguments if needed. Save your job and in the list select the `start` action, alternatively you can mark the `autostart` option and the command will be automatically started when created.
Starting a job

To start a job:

1. Select the job to be started.
2. Select the start action.
3. Click in Go.
4. The page will refresh and the job status will have changed. If it takes a long to run, refresh the page to see the updated the status.
5. A stop option is also available.

**Note:** If it takes too long to load the page, ASYNC_SIGNALS may not be activated. If its status gets stuck at QUEUED, verify if celery is running and properly configured.
Clicking at the link in the ID of a job, we can see the details of this job. For the job we just created, we can verify the output message and celery job status.

When we have an error during execution the traceback message will be available in the Celery traceback. In the next image a ping_mngmt_commands_http job was created with the arguments ["--force_exception", true]. Checking the text in this field can be useful when troubleshooting errors.
Manage using API endpoints

The execution of the management commands can be handled by http requests to an API: http://<your_geonode_host>/api/v2/management/.

All the requests need to be authenticated with administrative permissions (superuser).

You can find here a postman collection with all the examples listed here and other available endpoints:

geonode_mngmt_commands.postman_collection.json

List exposed commands

Getting a list of the exposed commands:

```
curl --location --request GET http://<your_geonode_host>/api/v2/management/commands/ --header 'Authorization: Basic YWRtaW46YWRtaW4='
```

Response:

```json
{
   "success": true,
   "error": null,
   "data": [
      "ping_mngmt_commands_http",
      "updatelayers",
      "set_all_datasets_metadata",
      "sync_geonode_maps",
      "importlayers",
      "sync_geonode_datasets"
   ]
}
```
Note: You should change the header Authorization (Basic YWRtaW46YWRtaW4=) to your Auth token, in this example I am using a token for admin as username and admin as password.

Creating a job

Optionally, before creating the job you can get its help message with the following call:

```
curl --location --request GET 'http://<your_geonode_host>/api/v2/management/commands/ping_mngmt_commands_http/' --header 'Authorization: Basic YWRtaW46YWRtaW4=
```

Creating a job for running ping_mngmt_commands_http with 30 seconds of sleep time:

```
curl --location --request POST 'http://<your_geonode_host>/api/v2/management/commands/ping_mngmt_commands_http/jobs/'
--header 'Authorization: Basic YWRtaW46YWRtaW4='
--header 'Content-Type: application/json'
--data-raw '{
  "args": ["--sleep", 30],
  "kwargs": {},
  "autostart": false
}
```

Response:

```
{
  "success": true,
  "error": null,
  "data": {
    "id": 8,
    "command": "ping_mngmt_commands_http",
    "app_name": "geonode.management_commands_http",
    "user": 1000,
    "status": "CREATED",
    "created_at": "2021-10-08T18:17:25.045752Z",
    "start_time": null,
    "end_time": null,
    "args": [
      "--sleep",
      30
    ],
    "kwargs": {},
    "celery_result_id": null,
    "output_message": null
  }
}
```

Note: Alternatively you can omit the jobs part of the url to create a job. (Using http://<your_geonode_host>/api/v2/management/commands/ping_mngmt_commands_http/ as url)
Start/Stop actions

To start the created job:

```
curl --location --request PATCH 'http://<your_geonode_host>/api/v2/management/jobs/8/\n__start/' --header 'Authorization: Basic YWRtaW46YWRtaW4=
```

Response:

```json
{
   "success": true,
   "error": null,
   "data": {
      "id": 8,
      "command": "ping_mngmt_commands_http",
      "app_name": "geonode.management_commands_http",
      "user": 1000,
      "status": "QUEUED",
      "created_at": "2021-10-08T18:17:25.045752Z",
      "start_time": null,
      "end_time": null,
      "args": [
         "--sleep",
         30
      ],
      "kwargs": {},
      "celery_result_id": null,
      "output_message": null
   }
}
```

**Note:** During execution the job can be interrupted using the following call:

```
curl --location --request PATCH 'http://<your_geonode_host>/api/v2/management/jobs/8/\n__stop/' --header 'Authorization: Basic YWRtaW46YWRtaW4=
```

Note that the status changed from **CREATED** to **QUEUED**, during execution it will be **STARTED** and at the end **FINISHED**.

Jobs list and status

You can verify your job status and details with the following call:

```
curl --location --request GET 'http://<your_geonode_host>/api/v2/management/jobs/8/\n__status/' --header 'Authorization: Basic YWRtaW46YWRtaW4=
```

Response:

```json
{
   "id": 8,
   "command": "ping_mngmt_commands_http",
   (continues on next page)
}
```
When running multiple jobs and to audit already ran jobs, a list of jobs can be retrieved using the following call:

```
curl --location --request GET 'http://<your_geonode_host>/api/v2/management/jobs/' --header 'Authorization: Basic YWRtaW46YWRtaW4='
```

Response:

```
{   "links": {     "next": null,     "previous": null   },   "total": 1,   "page": 1,   "page_size": 10,   "data": [     {       "id": 1,       "command": "ping_mngmt_commands_http",       "app_name": "geonode.management_commands_http",       "user": 1000,       "status": "FINISHED",       "created_at": "2021-10-08T18:20:02.761475Z"     }   ]}
```

**Note:** This list can be filtered by the fields “celery_result_id”, “command”, “app_name”, “status”, “user” and “user__username”.

---

1.25. GeoNode Management Commands
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 config file /home/geonode/geonode/geonode/settings.py (or /etc/geonode/settings.py if GeoNode has been installed using apt-get) and change LANGUAGE_CODE to the desired default language.

Note: A list of language codes can be found in the global django config file /usr/local/lib/python2.7/dist-packages/django/conf/global_settings.py (or /var/lib/geonode/lib/python2.7/site-packages/django/conf/global_settings.py if GeoNode has been installed using apt-get).

For example, to make French the default language use:

```
LANGUAGE_CODE = 'fr'
```

Unfortunately Django overrides this setting, giving the language setting of a user’s browser priority. For example, if 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

```
mkdir /usr/lib/python2.7/dist-packages/setmydefaultlanguage
```

or

```
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

```
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
    ""
```

(continues on next page)
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

```
MIDDLEWARE_CLASSES += (
    'setmydefaultlanguage.ForceDefaultLanguageMiddleware',
)
```

### 1.26.4 Restart

You will need to restart GeoNode accordingly to the installation method you have chosen.

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 3.2.x / 3.3.x

1. Upgrade the dependencies
2. Perform the `migrations` management command; in case some attribute is conflicting, remove it manually from the DB
3. Proform the `collectstatic` management command

**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 master branch.

This must be done manually and with particular attention.
workon <project environment>
cd <project_name>
pip install -r requirements.txt

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

**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
```

Apply migrations and apply basic fixtures:

```
./manage.py migrate --fake-initial
paver sync
```

**Note:** Incase of an error of `django.db.utils.ProgrammingError: column “colum-name” of relation “table-name” already exists` on running migrations, you can backup the field data with the following steps.

```
./manage.sh dbshell

ALTER TABLE <table> ADD COLUMN <colum-name>_bkp varchar;
UPDATE <table> SET <colum-name>_bkp = colum-name;
ALTER TABLE <table> DROP COLUMN <colum-name>;
\q
```

Run migration then:
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;
```

```
./manage createsuperuser
```

Update Templates

Update available templates to use {% load static %} instead of {% load staticfiles %}

1.28 GeoNode Async Signals

1.28.1 Supervisord and Systemd

1.28.2 Celery

1.28.3 Rabbitmq and Redis

1.28.4 How to: Async Upload via API

In geonode is possible to upload resources via API in async/sync way.

Here is available a full example of upload via API: https://github.com/GeoNode/geonode/blob/582d6efda74adb8042d1d897004bbf764e6e0285/geonode/upload/api/tests.py#L416

Step 1

Create a common client session, this is fundamental due the fact that geonode will check the request session. For example with requests we will do something like:

```python
import requests
client = requests.session()
```

Note: in Django this part is already managed
Step 2

Call the api/v2/uploads/upload endpoint in PUT (is a form-data endpoint) by specifying in files a dictionary with the names and the files that we want to uploads and a data payload with the required informations. For example:

```python
params = {
    "permissions": '{ "users": {"AnonymousUser": ["view_resourcebase"]}, "groups":{}}',
    "time": "false",
    "layer_title": "layer_title",
    "charset": "UTF-8",
}
files = {
    "filename": <_io.BufferedReader name="filename">
}
client.put(
    auth=HTTPBasicAuth(username, password),
    data=params,
    files=files,
)
```

Returns:
- dict with import id of the resource

Step 3

Call in the final upload page in order to trigger the actual import. If correctly set, Geoserver will manage the upload asyncronously.

```python
client.get("http://localhost:8000/upload/final?id={import_id}"")
```

The `import_id` is returned from the previous step

Step 4

The upload as been completed on GeoNode, we should check util GeoServer has complete his part. To do so, is enough to call the detailed information about the upload that we are performing

```python
client.get(f"http://localhost:8000/api/v2/uploads/{upload_id}"")
```

When the status is PROCESSED and the completion is 100% we are able to see the resource in geonode and geoserver
1.29 GeoNode Add a thesaurus

1.29.1 Introduction

GeoNode can import a thesaurus (or multiple thesauri) in order to index resources against subject terms or keywords. Thesauri can be managed manually in the admin panel, or imported as SKOS RDF using either the admin panel or the command-line:

1.29.2 Upload via the Admin panel

Navigate to the thesaurus page in the admin panel http://<your_geonode_host>/admin/base/thesaurus. On the top-right of the page a button named Upload thesaurus will be available:

![Thesaurus page in admin panel]

After clicking on it, a simple form for the upload will be shown which will allow you to select your desired RDF file:

![Upload RDF form]

By clicking on Upload RDF, the system will load the thesaurus and assign it a “slugified” name based on the file name. The name can be easily change later in the edit page.

If everything goes fine, a success message will be shown:

![Success message]

Otherwise the UI will show the error message:
1.29.3 Import via the load_thesaurus command

A thesaurus can also be loaded into GeoNode by using the load_thesaurus management command:

```bash
python manage.py load_thesaurus --help
```

- `-d`, `--dry-run` Only parse and print the thesaurus file, without perform insertion in the DB.
- `--name=NAME` Identifier name for the thesaurus in this GeoNode instance.
- `--file=FILE` Full path to a thesaurus in RDF format.

For example, in order add the INSPIRE Spatial Data Themes thesaurus into a GeoNode instance, download it as file `inspire-theme.rdf` with the command:

```bash
```

and then issue the command:

```bash
python manage.py load_thesaurus --file inspire-theme.rdf --name inspire_themes
```

The name is the identifier you’ll use to refer to this thesaurus in your GeoNode instance.

If you only want to make sure that a thesaurus file will be properly parsed, give the `--dry-run` parameter, so that nothing will be added to the DB.

*Note:* if the name starts with the string `fake`, the file will not be accessed at all, and some test keywords will be added to a fake new thesaurus. In this case the `dry-run` param will not be used.

1.29.4 Configure a thesaurus in GeoNode

**Configuration from Admin**

After you loaded a thesaurus into GeoNode, it should be configured in the *Admin* panel.

The panel can be reached from *Admin* link of the *User Menu* in the navigation bar or through this URL: http://<your_geonode_host>/admin/base/thesaurus.

Once you are on the Thesauri lists, select one thesaurus to open the Edit page

- **identifier**: (mandatory string) the identifier you used in the `load_thesaurus` commands.
- **title**: (mandatory string) The title of the thesaurus, set initially by the `load_thesaurus` command.
- **date**: (mandatory date) The Date of the thesaurus, set initially by the `load_thesaurus` command.
Change thesaurus

- **description**: (mandatory string) The description of the thesaurus, set initially by the `load_thesaurus` command.
- **slug**: (mandatory string) The slug of the thesaurus, set initially by the `load_thesaurus` command.
- **about**: (optional string) The about of the thesaurus, set initially by the `load_thesaurus` command.
- **card min**: (optional integer) The minimum cardinality, default = 0
- **card max**: (optional integer) The maximum cardinality, default = -1
- **facet**: (boolean) Decide if the thesaurus will be shown in the facet list, default: True
- **order**: (integer) Decide the listing order of the thesaurus in the facet list and in the metadata editor, default: 0, asc order from 0 to N

Cardinality:

- **card max=0** → Disabled, The Thesaurus will not appear in the GUI
- **card max=1 & card min = 0** → Single choice, optional.
- **card max=1 & card min = 1** → Single choice, required
- **card max=-1 & card min = 0** → [0..N] Multiple choices, optional
- **card max=-1 & card min = 1** → [1..N] Multiple choices, required

After the setup, in `Editing Tools -> Metadata -> Wizard` the thesaurus block will be shown like the following image:

![Thesaurus edit Interface](image-url)

Fig. 287: *The GeoNode Thesaurus edit Interface*
Fig. 288: The metadata interface with the Thesaurus enabled

Configuration via `settings.py`

**Warning:** Deprecated The Thesaurus configuration via settings is deprecated, will be removed in the future.

After you loaded a thesaurus into GeoNode, it should be configured in the `settings.py` file (or in the `local_settings`) in this way:

```python
THESAURUS = {'name': 'THESAURUS NAME', 'required': True|False, 'filter': True|False},
```

- **name**: (mandatory string) the identifier you used in the `load_thesaurus` commands.
- **required**: (optional boolean) if True, a keyword of this thesaurus is mandatory to complete the metadata. *Currently not implemented.*
- **filter**: (optional boolean) if True, a faceted list of keywords of this thesaurus will be presented on the search page.

So, in order to set up the INSPIRE themes thesaurus you may set the THESAURUS value as:

```python
THESAURUS = {'name': 'inspire_themes', 'required': True, 'filter': True}
```

### 1.29.5 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 GeoNode’s resource list views:

### 1.29.6 Exporting a thesaurus as RDF via the `dump_thesaurus` command

GeoNode thesauri can be exported as RDF using the `dump_thesaurus` command:

```
python manage.py dump_thesaurus --help
```

- `-n NAME, --name NAME` Dump the thesaurus with the given name
- `-f FORMAT, --format FORMAT` Format string supported by rdflib, e.g.: pretty-xml (default),

```
˓→json-ld, n3, nt, pretty-xml, trig, ttl, xml
```

(continues on next page)
 THESAURUS: INSPIRE_THE

Atmospheric conditions
 Coordinate reference syst...
 Sea regions

(continued from previous page)

--default-lang LANG Default language code for untagged string literals
-l, --list List available thesauri

The -n|--name argument refers, like the load_thesaurus command, to the thesaurus's identifier in GeoNode, as opposed to its title. If uploaded via the admin interface this is derived automatically from its file name. Information about thesauri can be shown on the command-line using dump_thesaurus with just the -l|--list option.

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

• 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

For reporting bugs please open a ticket at Github issues:

• https://github.com/GeoNode/geomnode/issues

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.

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.

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.

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

```bash
$ 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
```

(continues on next page)
$ 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.

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:
Identifying translation issues

From the ‘poedit’ menu ‘View’, make sure that ‘Entries with Errors first’ is checked:

Next click on ‘Validate Translations’ from the ‘Catalogue’ menu:

‘Poedit’ will place translations which may require additional consideration on top of the list. A warning mark means that the interpretation might be not entirely consistent with the original phrase. This is not necessarily an error, just a warning asking the user to double check.

Following to marked phrases, ‘Poedit’ will show untranslated sentences. When clicking on one, it can be translated through the bottom panel.

During translation pay special attention to the button saying ‘needs work’. In case this button is checked, the phrase will be marked as ‘fuzzy’ and ignored in GeoNode.
1.32. Provide Translations
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’s shell following commands need to be executed:

```bash
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:

```bash
django-admin makemessages --no-location -l en -d django -e "html,txt,py" -i docs
django-admin makemessages --no-location -l en -d djangojs -e "js" -i docs -i node_modules -i lib
```

This will update the english .po file. Also, to update the language which should be edited by settings the `-l fr` parameter. Continue with updating the .po file as described above.
1.33 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:

yarn install
Installs the required libraries to ./node_modules

yarn install <package>@version [--dev]
Installs a package with a defined version. Using --dev installs a dependency that is only available for the build process (see: package.json devDependencies).

yarn remove <package>
Removes a package.

yarn outdated
Shows version information.

yarn why <package>
Get information on why this package was installed.

For further information on how to install or use please visit the official yarn documentation.

File/Folder overview:

./static_dependencies.json
includes all dependencies associated with each file. For example all files which should be minified to assets.min.js are named as values. All files that should be copied to lib folder (for DEBUG_STATIC) are values of key other_dependencies and so on. Before you can use a dependency it has to be added to package.json by use of yarn.

./Gruntfile.js
reads the dependencies from static_dependencies.json and contains all workflows.
geonode/static/geonode

The ./geonode folder contains GeoNode’s stylesheets and javascript files. The CSS files are generated via less. CSS files should therefore never be changed directly but its 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 DEBU_STATIC=True. This will load unminified assets in your template.
2. Start the development server with paver start.
3. Use grunt watch to watch all less files for change.
4. Change styling in ./geonode/static/geonode/less
5. If our changes are as expected create a new build with grunt development (files are not minimized) or grunt production (files are minimized)

Example 2 – add/update a new library:

1. In your settings set DEBU_STATIC=True. This will load unminified assets in your template.
2. yarn add angular@1.7
3. vim static_dependencies.json Edit the file and add your dependency to its fitting destination. For example, assets.min.js
4. Check if some Django template (for example, base.html) includes the file and add it or adjust the version
5. use grunt production to build the package

For further tasks have a look at gruntfile.js or ask for help in the development mailing list

Note: Please make maintainers work easier and add a message to your commit why a library has been added. (For example, commit -m ‘select2 added for permissions form on layer detail page’)

1.35 API Schema

1.35.1 GeoNode API Schema

API v2 - REST

OpenAPI 3.0 Schema

GET /api/v2/
GeoNode Documentation, Release 3.2.1

Status Codes

• 200 OK – No response body

GET /api/v2/categories/
API endpoint that lists categories.

Query Parameters

• ordering (string) – Which field to use when ordering the results.
• page (integer) – A page number within the paginated result set.
• page_size (integer) – Number of results to return per page.
• search (string) – A search term.

Status Codes

• 200 OK –

GET /api/v2/categories/{id}/
API endpoint that lists categories.

Parameters

• id (integer) – A unique integer value identifying this topic category.

Status Codes

• 200 OK –

GET /api/v2/datasets/
API endpoint that allows layers to be viewed or edited.

Query Parameters

• ordering (string) – Which field to use when ordering the results.
• page (integer) – A page number within the paginated result set.
• page_size (integer) – Number of results to return per page.
• search (string) – A search term.

Status Codes

• 200 OK –

PATCH /api/v2/datasets/
API endpoint that allows layers to be viewed or edited.

Status Codes

• 200 OK –

GET /api/v2/datasets/{id}/
API endpoint that allows layers to be viewed or edited.

Parameters

• id (integer) – A unique integer value identifying this dataset.

Status Codes

• 200 OK –
PUT /api/v2/datasets/{id}/

Update one or more model instances.

If ENABLE_BULK_UPDATE is set, multiple previously-fetched records may be updated in a single call, provided their IDs.

If ENABLE_PATCH_ALL is set, multiple records may be updated in a single PATCH call, even without knowing their IDs.

**WARNING**: ENABLE_PATCH_ALL should be considered an advanced feature and used with caution. This feature must be enabled at the viewset level and must also be requested explicitly by the client via the “patch-all” query parameter.

This parameter can have one of the following values:

- **true (or 1)**: **records will be fetched and then updated in a transaction loop**
  - The `Model.save` method will be called and model signals will run
  - This can be slow if there are too many signals or many records in the query
  - This is considered the more safe and default behavior

- **query**: **records will be updated in a single query**
  - The `QuerySet.update` method will be called and model signals will not run
  - This will be fast, but may break data constraints that are controlled by signals
  - This is considered unsafe but useful in certain situations

The server’s successful response to a patch-all request will NOT include any individual records. Instead, the response content will contain a “meta” object with an “updated” count of updated records.

Examples:

Update one dog:

```json
PATCH /dogs/1/ {
  'fur': 'white'
}
```

Update many dogs by ID:

```json
PATCH /dogs/ [
  {'id': 1, 'fur': 'white'}, {'id': 2, 'fur': 'black'}, {'id': 3, 'fur': 'yellow'}
]
```

Update all dogs in a query:

```json
PATCH /dogs/?filter{fur.contains}=brown&patch-all=true {
  'fur': 'gold'
}
```

**Parameters**

- **id (integer)** – A unique integer value identifying this dataset.

**Status Codes**

- **200 OK** –
PATCH /api/v2/datasets/{id}/
API endpoint that allows layers to be viewed or edited.

Parameters

• **id** *(integer)* – A unique integer value identifying this dataset.

Status Codes

• **200 OK** –

GET /api/v2/datasets/{id}/{field_name}/
Fetch related object(s), as if sideloaded (used to support link objects).

This method gets mapped to /<resource>/<pk>/<field_name>/ by DynamicRouter for all DynamicRelation-Field fields. Generally, this method probably shouldn’t be overridden.

An alternative implementation would be to generate reverse queries. For an exploration of that approach, see:

https://gist.github.com/ryochiji/54687d675978c7d96503

Parameters

• **field_name** *(string)* –

• **id** *(integer)* – A unique integer value identifying this dataset.

Status Codes

• **200 OK** –

GET /api/v2/datasets/{id}/maplayers/
API endpoint allowing to retrieve the MapLayers list.

Parameters

• **id** *(integer)* – A unique integer value identifying this dataset.

Query Parameters

• **ordering** *(string)* – Which field to use when ordering the results.

• **page** *(integer)* – A page number within the paginated result set.

• **page_size** *(integer)* – Number of results to return per page.

• **search** *(string)* – A search term.

Status Codes

• **200 OK** –

GET /api/v2/datasets/{id}/maps/
API endpoint allowing to retrieve maps using the dataset.

Parameters

• **id** *(integer)* – A unique integer value identifying this dataset.

Query Parameters

• **ordering** *(string)* – Which field to use when ordering the results.

• **page** *(integer)* – A page number within the paginated result set.

• **page_size** *(integer)* – Number of results to return per page.

• **search** *(string)* – A search term.
Status Codes

- `200 OK` -

**GET /api/v2/documents/**

API endpoint that allows documents to be viewed or edited.

**Query Parameters**

- `ordering` *(string)* – Which field to use when ordering the results.
- `page` *(integer)* – A page number within the paginated result set.
- `page_size` *(integer)* – Number of results to return per page.
- `search` *(string)* – A search term.

**Status Codes**

- `200 OK` -

**PATCH /api/v2/documents/**

API endpoint that allows documents to be viewed or edited.

**Status Codes**

- `200 OK` -

**GET /api/v2/documents/{id}/**

API endpoint that allows documents to be viewed or edited.

**Parameters**

- `id` *(integer)* – A unique integer value identifying this document.

**Status Codes**

- `200 OK` -

**PUT /api/v2/documents/{id}/**

Update one or more model instances.

If ENABLE_BULK_UPDATE is set, multiple previously-fetched records may be updated in a single call, provided their IDs.

If ENABLE_PATCH_ALL is set, multiple records may be updated in a single PATCH call, even without knowing their IDs.

**WARNING**: ENABLE_PATCH_ALL should be considered an advanced feature and used with caution. This feature must be enabled at the viewset level and must also be requested explicitly by the client via the “patch-all” query parameter.

This parameter can have one of the following values:

**true (or 1): records will be fetched and then updated in a transaction loop**

- The `Model.save` method will be called and model signals will run
- This can be slow if there are too many signals or many records in the query
- This is considered the more safe and default behavior

**query: records will be updated in a single query**

- The `QuerySet.update` method will be called and model signals will not run
- This will be fast, but may break data constraints that are controlled by signals
- This is considered unsafe but useful in certain situations
The server’s successful response to a patch-all request will NOT include any individual records. Instead, the response content will contain a “meta” object with an “updated” count of updated records.

Examples:
Update one dog:

```
PATCH /dogs/1/ {
    ‘fur’: ‘white’
}
```

Update many dogs by ID:

```
PATCH /dogs/ [
    {‘id’: 1, ‘fur’: ‘white’}, {‘id’: 2, ‘fur’: ‘black’}, {‘id’: 3, ‘fur’: ‘yellow’}
]
```

Update all dogs in a query:

```
PATCH /dogs/?filter{fur.contains}=brown&patch-all=true {
    ‘fur’: ‘gold’
}
```

Parameters

- **id (integer)** – A unique integer value identifying this document.

Status Codes

- **200 OK** –

```patch /api/v2/documents/{id}/
```

API endpoint that allows documents to be viewed or edited.

Parameters

- **id (integer)** – A unique integer value identifying this document.

Status Codes

- **200 OK** –

```get /api/v2/documents/{id}/linked_resources/
```

API endpoint allowing to retrieve the DocumentResourceLink(s).

Parameters

- **id (integer)** – A unique integer value identifying this document.

Query Parameters

- **ordering (string)** – Which field to use when ordering the results.
- **page (integer)** – A page number within the paginated result set.
- **page_size (integer)** – Number of results to return per page.
- **search (string)** – A search term.

Status Codes

- **200 OK** –
GET /api/v2/geoapps/
API endpoint that allows geoapps to be viewed or edited.

Query Parameters
- **ordering** (string) – Which field to use when ordering the results.
- **page** (integer) – A page number within the paginated result set.
- **page_size** (integer) – Number of results to return per page.
- **search** (string) – A search term.

Status Codes
- **200 OK** –

POST /api/v2/geoapps/
Either create a single or many model instances in bulk using the Serializer’s many=True ability from Django REST >= 2.2.5.

The data can be represented by the serializer name (single or plural forms), dict or list.

Examples:
POST /dogs/ {
  "name": "Fido", "age": 2
}
POST /dogs/ {
  "dog": { "name": "Lucky", "age": 3
}
}
POST /dogs/ {
  "dogs": [ {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3} 
  ]
}
POST /dogs/ {
  {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}
}

Status Codes
- **201 Created** –

PATCH /api/v2/geoapps/
API endpoint that allows geoapps to be viewed or edited.

Status Codes
- **200 OK** –

GET /api/v2/geoapps/{id}/
API endpoint that allows geoapps to be viewed or edited.

Parameters
- **id** (integer) – A unique integer value identifying this geo app.
Status Codes

- **200 OK** –

**PUT /api/v2/geoapps/{id}/**
Update one or more model instances.

If **ENABLE_BULK_UPDATE** is set, multiple previously-fetched records may be updated in a single call, provided their IDs.

If **ENABLE_PATCH_ALL** is set, multiple records may be updated in a single PATCH call, even without knowing their IDs.

**WARNING**: **ENABLE_PATCH_ALL** should be considered an advanced feature and used with caution. This feature must be enabled at the viewset level and must also be requested explicitly by the client via the “patch-all” query parameter.

This parameter can have one of the following values:

- **true** (or 1): records will be fetched and then updated in a transaction loop
  - The `Model.save` method will be called and model signals will run
  - This can be slow if there are too many signals or many records in the query
  - This is considered the more safe and default behavior

- **query**: records will be updated in a single query
  - The `QuerySet.update` method will be called and model signals will not run
  - This will be fast, but may break data constraints that are controlled by signals
  - This is considered unsafe but useful in certain situations

The server’s successful response to a patch-all request will NOT include any individual records. Instead, the response content will contain a “meta” object with an “updated” count of updated records.

Examples:
Update one dog:

```
PATCH /dogs/1/ {
  'fur': 'white'
}
```

Update many dogs by ID:

```
PATCH /dogs/ [ {
  'id': 1, 'fur': 'white'}, {'id': 2, 'fur': 'black'}, {'id': 3, 'fur': 'yellow'} ]
```

Update all dogs in a query:

```
PATCH /dogs/?filter{fur.contains}=brown&patch-all=true { 
  'fur': 'gold'
}
```

**Parameters**

- **id** (integer) – A unique integer value identifying this geo app.

**Status Codes**
GeoNode Documentation, Release 3.2.1

• 200 OK –
PATCH /api/v2/geoapps/{id}/
API endpoint that allows geoapps to be viewed or edited.
Parameters
• id (integer) – A unique integer value identifying this geo app.
Status Codes
• 200 OK –
GET /api/v2/geoapps/{id}/{field_name}/
Fetch related object(s), as if sideloaded (used to support link objects).
This method gets mapped to /<resource>/<pk>/<field_name>/ by DynamicRouter for all DynamicRelationField fields. Generally, this method probably shouldn’t be overridden.
An alternative implementation would be to generate reverse queries. For an exploration of that approach, see:
https://gist.github.com/ryochiji/54687d675978c7d96503
Parameters
• field_name (string) –
• id (integer) – A unique integer value identifying this geo app.
Status Codes
• 200 OK –
GET /api/v2/groups/
API endpoint that allows gropus to be viewed or edited.
Query Parameters
• ordering (string) – Which field to use when ordering the results.
• page (integer) – A page number within the paginated result set.
• page_size (integer) – Number of results to return per page.
• search (string) – A search term.
Status Codes
• 200 OK –
POST /api/v2/groups/
Either create a single or many model instances in bulk using the Serializer’s many=True ability from Django
REST >= 2.2.5.
The data can be represented by the serializer name (single or plural forms), dict or list.
Examples:
POST /dogs/ {
“name”: “Fido”, “age”: 2
}
POST /dogs/ {

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```
"dog": { "name": "Lucky", "age": 3 }
}

POST /dogs/ {
    "dogs": [ {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3} ]
}

POST /dogs/ [
    {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}
]

Status Codes
• 201 Created –

PATCH /api/v2/groups/
API endpoint that allows groups to be viewed or edited.

Status Codes
• 200 OK –

DELETE /api/v2/groups/
Either delete a single or many model instances in bulk

DELETE /dogs/ {
    "dogs": [ {"id": 1}, {"id": 2} ]
}

DELETE /dogs/ [
    {"id": 1}, {"id": 2}
]

Status Codes
• 204 No Content – No response body

GET /api/v2/groups/{id}/
API endpoint that allows groups to be viewed or edited.

Parameters
• id (integer) – A unique integer value identifying this group profile.

Status Codes
• 200 OK –

PUT /api/v2/groups/{id}/
Update one or more model instances.

If ENABLE_BULK_UPDATE is set, multiple previously-fetched records may be updated in a single call, provided their IDs.
```
If ENABLE_PATCH_ALL is set, multiple records may be updated in a single PATCH call, even without knowing their IDs.

**WARNING**: ENABLE_PATCH_ALL should be considered an advanced feature and used with caution. This feature must be enabled at the viewset level and must also be requested explicitly by the client via the “patch-all” query parameter.

This parameter can have one of the following values:

- **true (or 1)**: records will be fetched and then updated in a transaction loop
  - The `Model.save` method will be called and model signals will run
  - This can be slow if there are too many signals or many records in the query
  - This is considered the more safe and default behavior

- **query**: records will be updated in a single query
  - The `QuerySet.update` method will be called and model signals will not run
  - This will be fast, but may break data constraints that are controlled by signals
  - This is considered unsafe but useful in certain situations

The server’s successful response to a patch-all request will NOT include any individual records. Instead, the response content will contain a “meta” object with an “updated” count of updated records.

**Examples:**

Update one dog:

```json
PATCH /dogs/1/ {
  'fur': 'white'
}
```

Update many dogs by ID:

```json
PATCH /dogs/ [
  {'id': 1, 'fur': 'white'}, {'id': 2, 'fur': 'black'}, {'id': 3, 'fur': 'yellow'}
]
```

Update all dogs in a query:

```json
PATCH /dogs/?filter{fur.contains}=brown&patch-all=true {
  'fur': 'gold'
}
```

**Parameters**

- `id (integer)` – A unique integer value identifying this group profile.

**Status Codes**

- **200 OK** –

**PATCH /api/v2/groups/{id}/**

API endpoint that allows group to be viewed or edited.

**Parameters**

- `id (integer)` – A unique integer value identifying this group profile.
DELETE /api/v2/groups/{id}/
   Either delete a single or many model instances in bulk

DELETE /dogs/ {
   “dogs”: [ {“id”: 1}, {“id”: 2} ]
}
DELETE /dogs/ [
   {“id”: 1}, {“id”: 2}
]

Parameters
   • id (integer) – A unique integer value identifying this group profile.

Status Codes
   • 200 OK –

GET /api/v2/groups/{id}/managers/
   API endpoint allowing to retrieve the Group managers.

Parameters
   • id (integer) – A unique integer value identifying this group profile.

Query Parameters
   • ordering (string) – Which field to use when ordering the results.
   • page (integer) – A page number within the paginated result set.
   • page_size (integer) – Number of results to return per page.
   • search (string) – A search term.

Status Codes
   • 200 OK –

GET /api/v2/groups/{id}/members/
   API endpoint allowing to retrieve the Group members.

Parameters
   • id (integer) – A unique integer value identifying this group profile.

Query Parameters
   • ordering (string) – Which field to use when ordering the results.
   • page (integer) – A page number within the paginated result set.
   • page_size (integer) – Number of results to return per page.
   • search (string) – A search term.

Status Codes
   • 200 OK –
GET /api/v2/groups/{id}/resources/
   API endpoint allowing to retrieve the Group specific resources.

Parameters
   • id (integer) – A unique integer value identifying this group profile.

Query Parameters
   • ordering (string) – Which field to use when ordering the results.
   • page (integer) – A page number within the paginated result set.
   • page_size (integer) – Number of results to return per page.
   • search (string) – A search term.

Status Codes
   • 200 OK –

GET /api/v2/harvesters/
   A viewset that can support dynamic API features.

Attributes: features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

Query Parameters
   • ordering (string) – Which field to use when ordering the results.
   • page (integer) – A page number within the paginated result set.
   • page_size (integer) – Number of results to return per page.

Status Codes
   • 200 OK –

POST /api/v2/harvesters/
   Either create a single or many model instances in bulk using the Serializer’s many=True ability from Django REST >= 2.2.5.
   The data can be represented by the serializer name (single or plural forms), dict or list.

Examples:
POST /dogs/ {
   "name": "Fido", "age": 2
}
POST /dogs/ {
   "dog": { "name": "Lucky", "age": 3

}
POST /dogs/ {
   "dogs": [ {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}

}
POST /dogs/ {
    "name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}
}

Status Codes
- 201 Created – 

GET /api/v2/harvesters/{harvester_id}/harvestable-resources/
Add the `update_list` method to a viewset

`update_list` is used by `api.routers.ListPatchRouter` in order to allow performing PATCH requests against a viewset’s list endpoint

Parameters
- `harvester_id` (integer) – 

Status Codes
- 200 OK – No response body

PATCH /api/v2/harvesters/{harvester_id}/harvestable-resources/
Add the `update_list` method to a viewset

`update_list` is used by `api.routers.ListPatchRouter` in order to allow performing PATCH requests against a viewset’s list endpoint

Parameters
- `harvester_id` (integer) – 

Status Codes
- 200 OK – No response body

GET /api/v2/harvesters/{id}/
A viewset that can support dynamic API features.

Attributes: features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

Parameters
- `id` (integer) – A unique integer value identifying this harvester.

Status Codes
- 200 OK – 

PUT /api/v2/harvesters/{id}/
Update one or more model instances.

If `ENABLE_BULK_UPDATE` is set, multiple previously-fetched records may be updated in a single call, provided their IDs.

If `ENABLE_PATCH_ALL` is set, multiple records may be updated in a single PATCH call, even without knowing their IDs.

WARNING: `ENABLE_PATCH_ALL` should be considered an advanced feature and used with caution. This feature must be enabled at the viewset level and must also be requested explicitly by the client via the “patch-all” query parameter.
This parameter can have one of the following values:

**true (or 1): records will be fetched and then updated in a transaction loop**
- The `Model.save` method will be called and model signals will run
- This can be slow if there are too many signals or many records in the query
- This is considered the more safe and default behavior

**query: records will be updated in a single query**
- The `QuerySet.update` method will be called and model signals will not run
- This will be fast, but may break data constraints that are controlled by signals
- This is considered unsafe but useful in certain situations

The server’s successful response to a patch-all request will NOT include any individual records. Instead, the response content will contain a “meta” object with an “updated” count of updated records.

Examples:

Update one dog:

```
PATCH /dogs/1/ {
  'fur': 'white'
}
```

Update many dogs by ID:

```
PATCH /dogs/ [ { 'id': 1, 'fur': 'white' }, { 'id': 2, 'fur': 'black' }, { 'id': 3, 'fur': 'yellow' } ]
```

Update all dogs in a query:

```
PATCH /dogs/?filter{fur.contains}=brown&patch-all=true { 'fur': 'gold' }
```

**Parameters**

- **id (integer)** – A unique integer value identifying this harvester.

**Status Codes**

- **200 OK** –

**PATCH /api/v2/harvesters/{id}/**

A viewset that can support dynamic API features.

**Attributes:** features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

**Parameters**

- **id (integer)** – A unique integer value identifying this harvester.

**Status Codes**

- **200 OK** –
DELETE /api/v2/harvesters/{id}/
   Either delete a single or many model instances in bulk

DELETE /dogs/ {
   “dogs”: [ {“id”: 1}, {“id”: 2}
   ]
}
DELETE /dogs/ [
   {“id”: 1}, {“id”: 2}
]

Parameters
   • id (integer) – A unique integer value identifying this harvester.

Status Codes
   • 204 No Content – No response body

GET /api/v2/harvesting-sessions/
A viewset that can support dynamic API features.

Attributes: features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

Query Parameters
   • ordering (string) – Which field to use when ordering the results.
   • page (integer) – A page number within the paginated result set.
   • page_size (integer) – Number of results to return per page.

Status Codes
   • 200 OK –

GET /api/v2/harvesting-sessions/{id}/
A viewset that can support dynamic API features.

Attributes: features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

Parameters
   • id (integer) – A unique integer value identifying this asynchronous harvesting session.

Status Codes
   • 200 OK –

GET /api/v2/keywords/
API endpoint that lists hierarchical keywords.

Query Parameters
   • ordering (string) – Which field to use when ordering the results.
   • page (integer) – A page number within the paginated result set.
   • page_size (integer) – Number of results to return per page.
• search**(string)** – A search term.

**Status Codes**

• 200 OK –

**GET /api/v2/keywords/{id}/**

API endpoint that lists hierarchical keywords.

**Parameters**

• **id**(integer) – A unique integer value identifying this hierarchical keyword.

**Status Codes**

• 200 OK –

**GET /api/v2/management/commands/**

Handle the exposed management commands usage:

• GET: List of exposed commands
• GET detail: Help for a specific command
• POST: Create a job (and automatic runs) for a specific command.

**Status Codes**

• 200 OK –

**POST /api/v2/management/commands/**

Creates and runs a management command job. Expects application/json content type in a following shape:

```json
{   "args": [<arg1>, <arg2>],   "kwargs": {<key1>: <val1>, <key2>: <val2>},   "autostart": bool
}
```

By default, autostart is set to true.

**Status Codes**

• 200 OK –

**GET /api/v2/management/commands/{cmd_name}/**

Handle the exposed management commands usage:

• GET: List of exposed commands
• GET detail: Help for a specific command
• POST: Create a job (and automatic runs) for a specific command.

**Parameters**

• **cmd_name**(string) –

**Status Codes**

• 200 OK –

**POST /api/v2/management/commands/{cmd_name}/**

Creates and runs a management command job. Expects application/json content type in a following shape:

```json
{   "args": [<arg1>, <arg2>],   "kwargs": {<key1>: <val1>, <key2>: <val2>},   "autostart": bool
}
```

By default, autostart is set to true.

**Parameters**
• **cmd_name**(string) –

**Status Codes**

• **200 OK** –

**GET /api/v2/management/commands/{cmd_name}/jobs/**
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

**Parameters**

• **cmd_name**(string) –

**Query Parameters**

• **app_name**(string) –
• **celery_result_id**(string) –
• **command**(string) –
• **page**(integer) – A page number within the paginated result set.
• **page_size**(integer) – Number of results to return per page.
• **status**(string) –
• **user**(integer) –
• **user__username**(string) –

**Status Codes**

• **200 OK** –

**POST /api/v2/management/commands/{cmd_name}/jobs/**
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

**Parameters**

• **cmd_name**(string) –

**Status Codes**

• **201 Created** –

**GET /api/v2/management/commands/{cmd_name}/jobs/{id}/**
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

**Parameters**

• **cmd_name**(string) –
• **id**(integer) – A unique integer value identifying this management command job.

**Status Codes**

• **200 OK** –

**PATCH /api/v2/management/commands/{cmd_name}/jobs/{id}/start/**
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

**Parameters**

• **cmd_name**(string) –
• **id**(integer) – A unique integer value identifying this management command job.

**Status Codes**
• 200 OK –

GET /api/v2/management/commands/{cmd_name}/jobs/{id}/status/
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

Parameters

• cmd_name (string) –
• id (integer) – A unique integer value identifying this management command job.

Status Codes

• 200 OK –

PATCH /api/v2/management/commands/{cmd_name}/jobs/{id}/stop/
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

Parameters

• cmd_name (string) –
• id (integer) – A unique integer value identifying this management command job.

Status Codes

• 200 OK –

GET /api/v2/management/jobs/
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

Query Parameters

• app_name (string) –
• celery_result_id (string) –
• command (string) –
• page (integer) – A page number within the paginated result set.
• page_size (integer) – Number of results to return per page.
• status (string) –
• user (integer) –
• user__username (string) –

Status Codes

• 200 OK –

POST /api/v2/management/jobs/
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

Status Codes

• 201 Created –

GET /api/v2/management/jobs/{id}/
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

Parameters

• id (integer) – A unique integer value identifying this management command job.

Status Codes

• 200 OK –
PATCH /api/v2/management/jobs/{id}/start/
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

Parameters
• id (integer) – A unique integer value identifying this management command job.

Status Codes
• 200 OK –

GET /api/v2/management/jobs/{id}/status/
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

Parameters
• id (integer) – A unique integer value identifying this management command job.

Status Codes
• 200 OK –

PATCH /api/v2/management/jobs/{id}/stop/
Create, List, Retrieve, Start, Stop and Get Status of a Management Command Job.

Parameters
• id (integer) – A unique integer value identifying this management command job.

Status Codes
• 200 OK –

GET /api/v2/maps/
API endpoint that allows maps to be viewed or edited.

Query Parameters
• ordering (string) – Which field to use when ordering the results.
• page (integer) – A page number within the paginated result set.
• page_size (integer) – Number of results to return per page.
• search (string) – A search term.

Status Codes
• 200 OK –

POST /api/v2/maps/
Changes in the m2m maplayers are committed before object changes. To protect the db, this action is done within an atomic tansation.

Status Codes
• 201 Created –

PATCH /api/v2/maps/
API endpoint that allows maps to be viewed or edited.

Status Codes
• 200 OK –

GET /api/v2/maps/{id}/
API endpoint that allows maps to be viewed or edited.

Parameters
• **id (integer)** – A unique integer value identifying this map.

**Status Codes**

• **200 OK –**

**PUT /api/v2/maps/{id}/**

Changes in the m2m `maplayers` are committed before object changes. To protect the db, this action is done within an atomic transaction.

**Parameters**

• **id (integer)** – A unique integer value identifying this map.

**Status Codes**

• **200 OK –**

**PATCH /api/v2/maps/{id}/**

API endpoint that allows maps to be viewed or edited.

**Parameters**

• **id (integer)** – A unique integer value identifying this map.

**Status Codes**

• **200 OK –**

**GET /api/v2/maps/{id}/{field_name}/**

Fetch related object(s), as if sideloaded (used to support link objects).

This method gets mapped to `<resource>/pk/<field_name>/` by DynamicRouter for all DynamicRelation-Field fields. Generally, this method probably shouldn't be overridden.

An alternative implementation would be to generate reverse queries. For an exploration of that approach, see:

https://gist.github.com/ryochiji/54687d675978c7d96503

**Parameters**

• **field_name (string)** –

• **id (integer)** – A unique integer value identifying this map.

**Status Codes**

• **200 OK –**

**GET /api/v2/maps/{id}/datasets/**

API endpoint allowing to retrieve the local MapLayers.

**Parameters**

• **id (integer)** – A unique integer value identifying this map.

**Query Parameters**

• **ordering (string)** – Which field to use when ordering the results.

• **page (integer)** – A page number within the paginated result set.

• **page_size (integer)** – Number of results to return per page.

• **search (string)** – A search term.

**Status Codes**
GET /api/v2/maps/{id}/maplayers/
API endpoint allowing to retrieve the MapLayers list.

Parameters

- id (integer) – A unique integer value identifying this map.

Query Parameters

- ordering (string) – Which field to use when ordering the results.
- page (integer) – A page number within the paginated result set.
- page_size (integer) – Number of results to return per page.
- search (string) – A search term.

Status Codes

- 200 OK –

GET /api/v2/owners/
API endpoint that lists all possible owners.

Query Parameters

- ordering (string) – Which field to use when ordering the results.
- page (integer) – A page number within the paginated result set.
- page_size (integer) – Number of results to return per page.
- search (string) – A search term.

Status Codes

- 200 OK –

GET /api/v2/owners/{id}/
API endpoint that lists all possible owners.

Parameters

- id (integer) – A unique integer value identifying this user.

Status Codes

- 200 OK –

GET /api/v2/regions/
API endpoint that lists regions.

Query Parameters

- ordering (string) – Which field to use when ordering the results.
- page (integer) – A page number within the paginated result set.
- page_size (integer) – Number of results to return per page.
- search (string) – A search term.

Status Codes

- 200 OK –

GET /api/v2/regions/{id}/
API endpoint that lists regions.
Parameters
  • **id** (*integer*) – A unique integer value identifying this region.

Status Codes
  • **200 OK** –

GET /api/v2/resource-service/execution-status/{execution_id}
Main dispatcher endpoint to follow an API request status progress
  • GET input: <str: execution id>
  • output: <ExecutionRequest>

Parameters
  • **execution_id** (*string*) –

Status Codes
  • **200 OK** – No response body

GET /api/v2/resources/
API endpoint that allows base resources to be viewed or edited.

Query Parameters
  • **ordering** (*string*) – Which field to use when ordering the results.
  • **page** (*integer*) – A page number within the paginated result set.
  • **page_size** (*integer*) – Number of results to return per page.
  • **search** (*string*) – A search term.

Status Codes
  • **200 OK** –

POST /api/v2/resources/
Either create a single or many model instances in bulk using the Serializer’s many=True ability from Django
REST >= 2.2.5.

The data can be represented by the serializer name (single or plural forms), dict or list.

Examples:
POST /dogs/ {
    "name": "Fido", "age": 2
}

POST /dogs/ {
    "dog": { "name": "Lucky", "age": 3
}
}

POST /dogs/ {
    "dogs": [ {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}]
}
POST /dogs/ [
  {“name”: “Fido”, “age”: 2}, {“name”: “Lucky”, “age”: 3}
]

Status Codes
• 201 Created –

PATCH /api/v2/resources/
API endpoint that allows base resources to be viewed or edited.

Status Codes
• 200 OK –

DELETE /api/v2/resources/
Either delete a single or many model instances in bulk

DELETE /dogs/ {
  “dogs”: [ {“id”: 1}, {“id”: 2}
  ]
}

DELETE /dogs/ [
  {“id”: 1}, {“id”: 2}
]

Status Codes
• 204 No Content – No response body

GET /api/v2/resources/{id}/
API endpoint that allows base resources to be viewed or edited.

Parameters
• id (integer) – A unique integer value identifying this resource base.

Status Codes
• 200 OK –

PUT /api/v2/resources/{id}/
Update one or more model instances.

If ENABLE_BULK_UPDATE is set, multiple previously-fetched records may be updated in a single call, provided their IDs.

If ENABLE_PATCH_ALL is set, multiple records may be updated in a single PATCH call, even without knowing their IDs.

WARNING: ENABLE_PATCH_ALL should be considered an advanced feature and used with caution. This feature must be enabled at the viewset level and must also be requested explicitly by the client via the “patch-all” query parameter.

This parameter can have one of the following values:

true (or 1): records will be fetched and then updated in a transaction loop
  • The Model.save method will be called and model signals will run
This can be slow if there are too many signals or many records in the query
This is considered the more safe and default behavior

query: records will be updated in a single query
The `QuerySet.update` method will be called and model signals will not run
This will be fast, but may break data constraints that are controlled by signals
This is considered unsafe but useful in certain situations

The server’s successful response to a patch-all request will NOT include any individual records. Instead, the response content will contain a “meta” object with an “updated” count of updated records.

Examples:
Update one dog:
```
PATCH /dogs/1/ {
    ‘fur’: ‘white’
}
```
Update many dogs by ID:
```
PATCH /dogs/ [
    {'id': 1, ‘fur’: ‘white’}, {'id': 2, ‘fur’: ‘black’}, {'id': 3, ‘fur’: ‘yellow’}
]
```
Update all dogs in a query:
```
PATCH /dogs/?filter{fur.contains}=brown&patch=all=true {
    ‘fur’: ‘gold’
}
```

Parameters
- `id` (integer) – A unique integer value identifying this resource base.

Status Codes
- 200 OK –

PATCH /api/v2/resources/{id}/
API endpoint that allows base resources to be viewed or edited.

Parameters
- `id` (integer) – A unique integer value identifying this resource base.

Status Codes
- 200 OK –

DELETE /api/v2/resources/{id}/
Either delete a single or many model instances in bulk
```
DELETE /dogs/ {
    “dogs”: [ {“id”: 1}, {“id”: 2} ]
}
```
DELETE /dogs/ ["id": 1], ["id": 2]

Parameters
• `id` (integer) – A unique integer value identifying this resource base.

Status Codes
• 204 No Content – No response body

GET /api/v2/resources/{id}/{field_name}/
Fetch related object(s), as if sideloaded (used to support link objects).
This method gets mapped to `/<resource>/<pk>/<field_name>/` by DynamicRouter for all DynamicRelation-Field fields. Generally, this method probably shouldn’t be overridden.

An alternative implementation would be to generate reverse queries. For an exploration of that approach, see:
https://gist.github.com/ryochiji/54687d675978c7d9503

Parameters
• `field_name` (string)
• `id` (integer) – A unique integer value identifying this resource base.

Status Codes
• 200 OK –

PUT /api/v2/resources/{id}/copy/
Instructs the Async dispatcher to execute a ‘COPY’ operation over a valid ‘uuid’.

Parameters
• `id` (integer) – A unique integer value identifying this resource base.

Status Codes
• 200 OK –

DELETE /api/v2/resources/{id}/delete/
Instructs the Async dispatcher to execute a ‘DELETE’ operation over a valid ‘uuid’.

Parameters
• `id` (integer) – A unique integer value identifying this resource base.

Status Codes
• 200 OK –

GET /api/v2/resources/{id}/extra_metadata/
Get/Update/Delete/Add extra metadata for resource

Parameters
• `id` (integer) – A unique integer value identifying this resource base.

Status Codes
• 200 OK –
POST /api/v2/resources/{id}/extra_metadata/
Get/Update/Delete/Add extra metadata for resource

Parameters
- **id** (integer) – A unique integer value identifying this resource base.

Status Codes
- **200 OK** –

PUT /api/v2/resources/{id}/extra_metadata/
Get/Update/Delete/Add extra metadata for resource

Parameters
- **id** (integer) – A unique integer value identifying this resource base.

Status Codes
- **200 OK** –

DELETE /api/v2/resources/{id}/extra_metadata/
Get/Update/Delete/Add extra metadata for resource

Parameters
- **id** (integer) – A unique integer value identifying this resource base.

Status Codes
- **204 No Content** – No response body

POST /api/v2/resources/{id}/favorite/
API endpoint allowing to retrieve the favorite Resources.

Parameters
- **id** (integer) – A unique integer value identifying this resource base.

Query Parameters
- **ordering** (string) – Which field to use when ordering the results.
- **page** (integer) – A page number within the paginated result set.
- **page_size** (integer) – Number of results to return per page.
- **search** (string) – A search term.

Status Codes
- **200 OK** –

DELETE /api/v2/resources/{id}/favorite/
API endpoint allowing to retrieve the favorite Resources.

Parameters
- **id** (integer) – A unique integer value identifying this resource base.

Query Parameters
- **ordering** (string) – Which field to use when ordering the results.
- **page** (integer) – A page number within the paginated result set.
- **page_size** (integer) – Number of results to return per page.
- **search** (string) – A search term.
Status Codes

- **200 OK** –

**GET /api/v2/resources/{id}/permissions/**

Sets an object’s the permission levels based on the perm_spec JSON.

the mapping looks like: ```

`users`: {'AnonymousUser': ['view'], <username>: ['perm1','perm2','perm3'],
  <username2>: ['perm1','perm2','perm3']...}

'groups': {
    <groupname>: ['perm1','perm2','perm3'], <groupname2>:
    ['perm1','perm2','perm3'], ...
}
```

**Parameters**

- **id** *(integer)* – A unique integer value identifying this resource base.

**Status Codes**

- **200 OK** – No response body

**PUT /api/v2/resources/{id}/permissions/**

Sets an object’s the permission levels based on the perm_spec JSON.

the mapping looks like: ```

'users': {'AnonymousUser': ['view'], <username>: ['perm1','perm2','perm3'],
  <username2>: ['perm1','perm2','perm3']...}

'groups': {
    <groupname>: ['perm1','perm2','perm3'], <groupname2>:
    ['perm1','perm2','perm3'], ...
}
```

**Parameters**

- **id** *(integer)* – A unique integer value identifying this resource base.

**Status Codes**

- **200 OK** – No response body

**PATCH /api/v2/resources/{id}/permissions/**

Sets an object’s the permission levels based on the perm_spec JSON.

the mapping looks like: ```

'users': {'AnonymousUser': ['view'], <username>: ['perm1','perm2','perm3'],
  <username2>: ['perm1','perm2','perm3']...}

'groups': {
    <groupname>: ['perm1','perm2','perm3'], <groupname2>:
    ['perm1','perm2','perm3'], ...
}
```

1.35. API Schema
DELETE /api/v2/resources/{id}/permissions/

Sets an object’s the permission levels based on the perm_spec JSON.

the mapping looks like:
```
{
    'users': {'AnonymousUser': ['view'], <username>: ['perm1','perm2','perm3'],
              <username2>: ['perm1','perm2','perm3'] ... },
    'groups': {
              <groupname>: ['perm1','perm2','perm3'], <groupname2>: ['perm1','perm2','perm3']...
    }
}
```

GET /api/v2/resources/{id}/ratings/

API endpoint allowing to rate and get overall rating of the Resource.

POST /api/v2/resources/{id}/ratings/

API endpoint allowing to rate and get overall rating of the Resource.

PUT /api/v2/resources/{id}/set_thumbnail/

API endpoint allowing to set thumbnail of the Resource.

PUT /api/v2/resources/{id}/update/

Instructs the Async dispatcher to execute a ‘UPDATE’ operation over a valid ‘uuid’.
Parameters
  • **id** (*integer*) – A unique integer value identifying this resource base.

Status Codes
  • **200 OK** –

**POST /api/v2/resources/{resource_id}/set_thumbnail_from_bbox/**
API endpoint allowing to set the thumbnail url for an existing dataset.

Parameters
  • **resource_id** (*string*) –

Status Codes
  • **200 OK** –

**GET /api/v2/resources/approved/**
API endpoint allowing to retrieve the approved Resources.

Query Parameters
  • **ordering** (*string*) – Which field to use when ordering the results.
  • **page** (*integer*) – A page number within the paginated result set.
  • **page_size** (*integer*) – Number of results to return per page.
  • **search** (*string*) – A search term.

Status Codes
  • **200 OK** –

**POST /api/v2/resources/create/{resource_type}/**
Instructs the Async dispatcher to execute a ‘CREATE’ operation.

Parameters
  • **resource_type** (*string*) –

Status Codes
  • **200 OK** –

**GET /api/v2/resources/favorites/**
API endpoint allowing to retrieve the favorite Resources.

Query Parameters
  • **ordering** (*string*) – Which field to use when ordering the results.
  • **page** (*integer*) – A page number within the paginated result set.
  • **page_size** (*integer*) – Number of results to return per page.
  • **search** (*string*) – A search term.

Status Codes
  • **200 OK** –

**GET /api/v2/resources/featured/**
API endpoint allowing to retrieve the featured Resources.

Query Parameters
  • **ordering** (*string*) – Which field to use when ordering the results.
• **page (integer)** – A page number within the paginated result set.
• **page_size (integer)** – Number of results to return per page.
• **search (string)** – A search term.

**Status Codes**

• **200 OK** –

**POST /api/v2/resources/ingest/{resource_type}/**
Instructs the Async dispatcher to execute a ‘INGEST’ operation.

**Parameters**

• **resource_type (string)** –

**Status Codes**

• **200 OK** –

**GET /api/v2/resources/published/**
API endpoint allowing to retrieve the published Resources.

**Query Parameters**

• **ordering (string)** – Which field to use when ordering the results.
• **page (integer)** – A page number within the paginated result set.
• **page_size (integer)** – Number of results to return per page.
• **search (string)** – A search term.

**Status Codes**

• **200 OK** –

**GET /api/v2/resources/resource_types/**
Returns the list of available ResourceBase polymorphic_ctypes.

the mapping looks like:

```json
{
    "resource_types": [
        {
            "name": "layer", "count": <number of layers>
        }, {
            "name": "map", "count": <number of maps>
        }, {
            "name": "document", "count": <number of documents>
        }, {
            "name": "geostory", "count": <number of geostories>
        }
    ]
}
```

**Status Codes**

• **200 OK** –
GET /api/v2/schema/
OpenApi3 schema for this API. Format can be selected via content negotiation.

- YAML: application/vnd.oai.openapi
- JSON: application/vnd.oai.openapi+json

Query Parameters
- format (string) –
- lang (string) –

Status Codes
- 200 OK –

GET /api/v2/tkeywords/
API endpoint that lists Thesaurus keywords.

Query Parameters
- ordering (string) – Which field to use when ordering the results.
- page (integer) – A page number within the paginated result set.
- page_size (integer) – Number of results to return per page.
- search (string) – A search term.

Status Codes
- 200 OK –

GET /api/v2/tkeywords/{id}/
API endpoint that lists Thesaurus keywords.

Parameters
- id (integer) – A unique integer value identifying this thesaurus keyword.

Status Codes
- 200 OK –

GET /api/v2/upload-parallelism-limits/
A viewset that can support parallelism limits.

Attributes: features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

Query Parameters
- ordering (string) – Which field to use when ordering the results.
- page (integer) – A page number within the paginated result set.
- page_size (integer) – Number of results to return per page.

Status Codes
- 200 OK –

POST /api/v2/upload-parallelism-limits/
Either create a single or many model instances in bulk using the Serializer’s many=True ability from Django REST >= 2.2.5.
The data can be represented by the serializer name (single or plural forms), dict or list.

Examples:

```json
POST /dogs/ {
    "name": "Fido", "age": 2
}

POST /dogs/ {
    "dog": { "name": "Lucky", "age": 3
    }
}

POST /dogs/ {
    "dogs": [
        { "name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}
    ]
}

POST /dogs/ [
    {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}
]
```

**Status Codes**

- 201 Created –

GET /api/v2/upload-parallelism-limits/{slug}/

A viewset that can support dynamic API features.

**Attributes:** features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

**Parameters**

- **slug** (string) – A unique value identifying this upload parallelism limit.

**Status Codes**

- 200 OK –

GET /api/v2/upload-size-limits/

A viewset that can support dynamic API features.

**Attributes:** features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

**Query Parameters**

- **ordering** (string) – Which field to use when ordering the results.
- **page** (integer) – A page number within the paginated result set.
- **page_size** (integer) – Number of results to return per page.

**Status Codes**

- 200 OK –
POST /api/v2/upload-size-limits/
Either create a single or many model instances in bulk using the Serializer’s many=True ability from Django REST >= 2.2.5.

The data can be represented by the serializer name (single or plural forms), dict or list.
Examples:
POST /dogs/ {
    “name”: “Fido”, “age”: 2
}
POST /dogs/ {
    “dog”: {
        “name”: “Lucky”, “age”: 3
    }
}
POST /dogs/ {
    “dogs”: [
        {“name”: “Fido”, “age”: 2}, {“name”: “Lucky”, “age”: 3}
    ]
}
POST /dogs/ [
    {“name”: “Fido”, “age”: 2}, {“name”: “Lucky”, “age”: 3}
]

Status Codes
• 201 Created –

GET /api/v2/upload-size-limits/{slug}/
A viewset that can support dynamic API features.
Attributes: features: A list of features supported by the viewset. meta: Extra data that is added to the response by the DynamicRenderer.

Parameters
• slug (string) – A unique value identifying this upload size limit.

Status Codes
• 200 OK –

GET /api/v2/uploads/
API endpoint that allows uploads to be viewed or edited.

Query Parameters
• ordering (string) – Which field to use when ordering the results.
• page (integer) – A page number within the paginated result set.
• page_size (integer) – Number of results to return per page.
• search (string) – A search term.

Status Codes
POST /api/v2/uploads/
Either create a single or many model instances in bulk using the Serializer’s many=True ability from Django REST >= 2.2.5.

The data can be represented by the serializer name (single or plural forms), dict or list.

Examples:
POST /dogs/ {
    "name": "Fido", "age": 2
}

POST /dogs/ {
    "dog": { "name": "Lucky", "age": 3
}
}

POST /dogs/ {
    "dogs": [ {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}
    ]
}

POST /dogs/ [ {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}
]

Status Codes
• 200 OK –

GET /api/v2/uploads/{id}/
API endpoint that allows uploads to be viewed or edited.

Parameters
• id (integer) – A unique integer value identifying this upload.

Status Codes
• 200 OK –

POST /api/v2/uploads/upload/
Starts an upload session based on the Dataset Upload Form.

the form params look like: `...`

`csrfmiddlewaretoken': self.csrf_token, 'permissions': '{ "users": {"AnonymousUser": [
"view_resourcebase"]}, "groups":{ }}, 'time': 'false', 'charset': 'UTF-8', 'base_file': base_file, 'dbf_file': dbf_file, 'shx_file': shx_file, 'prj_file': prj_file, 'tif_file
`

Status Codes
• 201 Created – No response body
GET /api/v2/users/
API endpoint that allows users to be viewed or edited.

Query Parameters
- **ordering** *(string)* – Which field to use when ordering the results.
- **page** *(integer)* – A page number within the paginated result set.
- **page_size** *(integer)* – Number of results to return per page.
- **search** *(string)* – A search term.

Status Codes
- **200 OK** –

POST /api/v2/users/
Either create a single or many model instances in bulk using the Serializer’s many=True ability from Django REST >= 2.2.5.

The data can be represented by the serializer name (single or plural forms), dict or list.

Examples:
POST /dogs/ {
   "name": "Fido", "age": 2
}
POST /dogs/ {
   "dog": { "name": "Lucky", "age": 3
}
}
POST /dogs/ {
   "dogs": [{"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}]
}
POST /dogs/ {
   {"name": "Fido", "age": 2}, {"name": "Lucky", "age": 3}
}

Status Codes
- **201 Created** –

PATCH /api/v2/users/
API endpoint that allows users to be viewed or edited.

Status Codes
- **200 OK** –

DELETE /api/v2/users/
Either delete a single or many model instances in bulk

DELETE /dogs/ {  

“dogs”: [ {“id”: 1}, {“id”: 2} 
] 
DELETE /dogs/ [ 
{“id”: 1}, {“id”: 2} 
] 

Status Codes
• 204 No Content – No response body

GET /api/v2/users/{id}/
API endpoint that allows users to be viewed or edited.

Parameters
• id (integer) – A unique integer value identifying this user.

Status Codes
• 200 OK –

PUT /api/v2/users/{id}/
Update one or more model instances.

If ENABLE_BULK_UPDATE is set, multiple previously-fetched records may be updated in a single call, provided their IDs.

If ENABLE_PATCH_ALL is set, multiple records may be updated in a single PATCH call, even without knowing their IDs.

WARNING: ENABLE_PATCH_ALL should be considered an advanced feature and used with caution. This feature must be enabled at the viewset level and must also be requested explicitly by the client via the “patch-all” query parameter.

This parameter can have one of the following values:

true (or 1): records will be fetched and then updated in a transaction loop
• The Model.save method will be called and model signals will run
• This can be slow if there are too many signals or many records in the query
• This is considered the more safe and default behavior

query: records will be updated in a single query
• The QuerySet.update method will be called and model signals will not run
• This will be fast, but may break data constraints that are controlled by signals
• This is considered unsafe but useful in certain situations

The server’s successful response to a patch-all request will NOT include any individual records. Instead, the response content will contain a “meta” object with an “updated” count of updated records.

Examples:
Update one dog:

PATCH /dogs/1/ { 
‘fur’: ‘white’
Update many dogs by ID:

PATCH /dogs/ 
{
   {'id': 1, 'fur': 'white'}, {'id': 2, 'fur': 'black'}, {'id': 3, 'fur': 'yellow'}
}

Update all dogs in a query:

PATCH /dogs/?filter{fur.contains}=brown&patch-all=true 
{‘fur’: ‘gold’}

Parameters

• \textbf{id} (integer) – A unique integer value identifying this user.

Status Codes

• 200 OK –

PATCH /api/v2/users/{id}/

API endpoint that allows users to be viewed or edited.

Parameters

• \textbf{id} (integer) – A unique integer value identifying this user.

Status Codes

• 200 OK –

DELETE /api/v2/users/{id}/

Either delete a single or many model instances in bulk

DELETE /dogs/ 
{“dogs”: [ {“id”: 1}, {“id”: 2} ]}

DELETE /dogs/ 
{“id”: 1}, {“id”: 2}

Parameters

• \textbf{id} (integer) – A unique integer value identifying this user.

Status Codes

• 204 No Content – No response body

GET /api/v2/users/{id}/groups/

API endpoint allowing to retrieve the Groups the user is member of.

Parameters

• \textbf{id} (integer) – A unique integer value identifying this user.
Query Parameters

- **ordering** *(string)* – Which field to use when ordering the results.
- **page** *(integer)* – A page number within the paginated result set.
- **page_size** *(integer)* – Number of results to return per page.
- **search** *(string)* – A search term.

Status Codes

- **200 OK** –

GET `/api/v2/users/{id}/resources/`

API endpoint allowing to retrieve the Resources visible to the user.

**Parameters**

- **id** *(integer)* – A unique integer value identifying this user.

Query Parameters

- **ordering** *(string)* – Which field to use when ordering the results.
- **page** *(integer)* – A page number within the paginated result set.
- **page_size** *(integer)* – Number of results to return per page.
- **search** *(string)* – A search term.

Status Codes

- **200 OK** –

### 1.36 How to Develop

#### 1.36.1 Start to develop with Docker

How to run the instance for development

There are two options to develop using Docker containers:

- **Alternative A**: Running by command line and editing the code using your preferred editor (usually harder).
- **Alternative B**: Using the vscode remote containers extension (easier).

**Alternative A: Building and running Docker for development**

Build (first time only):

```bash
docker-compose --project-name geonode -f docker-compose.yml -f .devcontainer/docker-compose.yml build
```

Running:

```bash
docker-compose --project-name geonode -f docker-compose.yml -f .devcontainer/docker-compose.yml up
```
Note: If you are running `postgresql` and `tomcat9` services, you need to stop them, `docker-compose` will take care of running the database and geonode service.

Otherwise, you will get the following error:

```
ERROR: for db Cannot start service db: driver failed programming external connectivity on endpoint db4geonode: Error starting userland proxy: listen tcp4 0.0.0.5432: bind: address already in use
ERROR: Encountered errors while bringing up the project.
```

Running the geonode application in debug mode:

```
docker exec -it django4geonode bash -c "python manage.py runserver 0.0.0.8000"
```

When running, you can debug the application using your preferred method. For example, you can edit a file, save it and see your modifications. You can also use `ipdb` to add breakpoints and inspect your code (Writing `import ipdb; ipdb.set_trace()` in the line you want your breakpoint).

Another option is to use `debugpy` alongside with `vscode`, for this you have to enable `debugpy` inside your `django4geonode` container:

```
docker exec -it django4geonode bash -c "pip install debugpy -t /tmp && python /tmp/debugpy --wait-for-client --listen 0.0.0.5678 manage.py runserver 0.0.0.8000 --nothreading --noreload"
```

Select “Run and Debug” in vscode and use the following launch instruction in your `.vscode/launch.json` file:

```
launch.json
```

**Alternative B: Using vscode extension**

Alternatively, you can develop using the vscode `remote containers` extension. In this approach you need to:

- Install the extension in your vscode: `ms-vscode-remote.remote-containers`
- On your command pallet, select: “Remote-Containers: Reopen in Container”
- If it’s the first time, vscode will take care of building the images. This might take some time.
- Then a new vscode window will open, and it’ll be connected to your docker container.
- The message “Dev Container: Debug Docker Compose” will appear in the bottom-left corner of that window.
- In the vscode terminal, you’re going to see something similar to `root@77e80acc89b8:/usr/src/geonode#`
- To run your application, you can use the integrated terminal (`./manage.py runserver 0.0.0.8000`) or the vscode “Run and Debug” option. For launching with “Run and Debug”, use the following instruction file: `launch.json`

For more information, take a read at vscode remote containers help page.
1.36.2 How to Install GeoNode-Core for development

Summary of installation

This section demonstrates a summarization of the steps to be followed in order to install GeoNode-Core for development using Ubuntu 18.04. The following steps will be 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 3. Postgis database Setup

$ sudo apt-get install postgresql-10 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

$ su postgres
$ createdb geonode_dev
$ createdb geonode_dev-imports
$ psql
$ postgres=
$ postgres=# CREATE USER geonode_dev WITH PASSWORD 'geonode_dev'; # should be same as password in setting.py
$ postgres=# GRANT ALL PRIVILEGES ON DATABASE "geonode_dev" to geonode_dev;
$ postgres=# GRANT ALL PRIVILEGES ON DATABASE "geonode_dev-imports" to geonode_dev;
$ postgres=# \
$ 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

sudo gedit /etc/postgresql/10/main/pg_hba.conf

Scroll to the bottom of the file and edit this line

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

To be as follows
# "local" is for Unix domain socket connections only
c

```
local  all  all  trust
```

Then restart PostgreSQL to make the changes effective

```
sudo service postgresql restart
```

Java dependencies

```
$ sudo apt-get install -y openjdk-11-jdk --no-install-recommends
```

Install supporting tools

```
$ 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.

```
$ 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

```
$ 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
Install Nodejs PPA and other tools required for static development
This is required for static development

**Note:** If you are following GeoNode’s training, nodejs is already installed in the Virtual Machine skip the first three command and jump to cd geonode/geonode/static

```bash
$ sudo apt-get install nodejs npm
$ cd geonode/geonode/static
$ npm install --save-dev
```

**Note:** Every time you want to update the static files after making changes to the sources, go to geonode/static and run ‘grunt production’.

**Warning:** Starting from the following step, you have to make sure that you installed GDAL correctly according to the documentation page “Install GDAL for Development”

Install GeoNode in the new active local virtualenv

```bash
$ cd /home/geonode/dev  # or to the directory containing your cloned GeoNode
$ pip install -e geonode
$ cd geonode/geonode
```

Create local_settings.py

Copy the sample file /home/geonode/dev/geonode/geonode/local_settings.py.geoserver.sample and rename it to be local_settings.py

```bash
$ cd /home/geonode/dev/geonode
$ cp geonode/local_settings.py.geoserver.sample geonode/local_settings.py
$ gedit geonode/local_settings.py
```

In the local_settings.py file, add the following line after the import statements:

```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.contrib.gis.db.backends.postgis',
    # Empty ENGINE name disables
    'NAME': 'geonode_dev-imports',
    'USER': 'geonode_dev',
    'PASSWORD': 'geonode_dev',
    .......
    .......
    .......
    ...
}
```

In the CATALOGUE dictionary under the ‘default’ key, uncomment the USER and PASSWORD keys to activate the credentials for GeoNetwork as follows:

```python
CATALOGUE = {
    'default': {
        # The underlying CSW implementation
        # default is pycsw in local mode (tied directly to GeoNode Django DB)
        'ENGINE': 'geonode.catalogue.backends.pycsw_local',
        # pycsw in non-local mode
        # 'ENGINE': 'geonode.catalogue.backends.pycsw_http',
        # GeoNetwork opensource
        # 'ENGINE': 'geonode.catalogue.backends.geonetwork',
        # deegree and others
        # 'ENGINE': 'geonode.catalogue.backends.generic',
        # The FULLY QUALIFIED base url to the CSW instance for this GeoNode
        'URL': urljoin(SITEURL, '/catalogue/csw'),
        # 'URL': 'http://localhost:8080/geonetwork/srv/en/csw',
        # 'URL': 'http://localhost:8080/deegree-csw-demo-3.0.4/services',
        # login credentials (for GeoNetwork)
        'USER': 'admin',
        'PASSWORD': 'admin',
        # 'ALTERNATES_ONLY': True,
    }
}
```

5- Install and Start Geoserver

From the virtual environment, first you need to align the database structure using the following command:

```bash
$ cd /home/geonode/dev/geonode
$ python manage.py migrate
```
Warning: If the start fails because of an import error related to osgeo or libgeos, then please consult the Install GDAL for Development

then setup GeoServer using the following command:

```
$ 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:

```
[tasks]
  geonode.documents.tasks.create_document_thumbnail
  geonode.documents.tasks.delete_orphaned_document_files
  geonode.documents.tasks.delete_orphaned_thumbnails
  geonode.geoserver.tasks.geoserver_update_layers
  geonode.layers.tasks.delete_layer
  geonode.maps.tasks.delete_map
  geonode.security.tasks.synch_guardian
  geonode.services.tasks.update.harvest_resource
  geonode.tasks.email.send_mail
  geonode.tasks.notifications.send_queued_notifications
  imagekit.cachefiles.backends._generate_file

Performing system checks...

System check identified no issues (1 silenced).
January 21, 2020 - 22:49:50
Django version 1.11.27, using settings 'geonode.settings'
Starting development server at http://0.0.0.0:8000/
Quit the server with CONTROL-C.
GeoNode is now available.
```

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
```

```bash
$ ls /home/geonode/dev  # should output: geonode  my_geonode
```

**Note:** Although the following command might show that the majority of requirements are already satisfied “because GeoNode-Core was already installed”, it is recommended to still execute it as it might update or install any missing...
2- Install all the required packages/tools for GeoNode-Project as follows:

```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

$ 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
```

2- Clone the geonode-project repo from Github

```bash
$ git clone https://github.com/GeoNode/geonode-project.git -b 3.2.x
```

3- Install Django framework as follows

```bash
$ pip install Django==3.2
```

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

1.36.3 How to run GeoNode Core for development

In order to start Geonode Core for development, you need to make sure that no Geonode instance is running first. This can be done by running the following commands:

```
$ cd /home/user/geonode
$ paver stop_geoserver
$ paver stop_django
```

Then you need to start both geoserver and django services as follows:

```
$ paver start_geoserver
$ paver start_django
```

Now you can visit your Geonode GUI by typing http://localhost:8000 into your browser window.

1.36.4 How to run GeoNode Project for development

In order to run a project for development, the following steps have to be followed:

1. Make sure there is no running instance of Geonode first by running the following command:

```
$ cd /home/user/my_geonode
$ paver stop
```

   The above command will stop all services related to Geonode if running

2. Start the servers by running paver start as follows:

```
$ paver start
```

Now you can visit your geonode project site by typing http://localhost:8000 into your browser window.
1.36.5 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
```

```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 use 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

```javascript
vim js/previewPlugins.js
...
BurgerMenuPlugin: require('./MapStore2/web/client/plugins/BurgerMenu'),
ScaleBoxPlugin: require('./MapStore2/web/client/plugins/ScaleBox'),
MapFooterPlugin: require('./MapStore2/web/client/plugins/MapFooter'),
// PrintPlugin: require('./MapStore2/web/client/plugins/Print'),
TimelinePlugin: require('./MapStore2/web/client/plugins/Timeline'),
PlaybackPlugin: require('./MapStore2/web/client/plugins/Playback'),
...
```

Example 2: Disable the MousePositionPlugin from the big maps

```javascript
vim js/plugins.js
...
SaveAsPlugin: require('./MapStore2/web/client/plugins/SaveAs').default,
MetadataExplorerPlugin: require('./MapStore2/web/client/plugins/MetadataExplorer'),
GridContainerPlugin: require('./MapStore2/web/client/plugins/GridContainer'),
StyleEditorPlugin: require('./MapStore2/web/client/plugins/StyleEditor'),
TimelinePlugin: require('./MapStore2/web/client/plugins/Timeline'),
PlaybackPlugin: require('./MapStore2/web/client/plugins/Playback'),
// MousePositionPlugin: require('./MapStore2/web/client/plugins/MousePosition'),
SearchPlugin: require('./MapStore2/web/client/plugins/Search'),
SearchServicesConfigPlugin: require('./MapStore2/web/client/plugins/SearchServicesConfig'),
...
```

1.36.6 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:

```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
```

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, documents, favorite, geonode_client, geonode_themes, groups, guardian, invitations, layers, maps, mapstore2_adapter, monitoring, oauth2_provider, people, pinax_notifications, services, sessions, sites, socialaccount, taggit, tastypie, upload, user_messages. Run ‘python manage.py migrate’ to apply them.

Which means you have some sql statements not executed yet and you need to run the “migrate” to sync your database first then “paver start” again as follows:
$ python manage.py migrate
$ paver start

**Warning:** If encountered this message: (Invalid HTTP_HOST header: '0.0.0.0:8000'). You may need to add u'0.0.0.0' to ALLOWED_HOSTS) It can be fixed in the settings.py file. You will need to add:
ALLOWED_HOSTS = ['0.0.0.0'] in settings.py

6- Once the previous step is done, you can visit 0.0.0.0:8000 to view the GUI of GeoNode. However, we still don’t have an account in order to login from the GUI. This can be done using “paver sync”. The command will create sync with latest fixtures and also creates a superuser “admin” with default password “admin”

7- Use the created account to login from the GUI through localhost:8000 or 0.0.0.0:8000
2- Customize the look and feel

In this section we will change the look and feel of GeoNode, in particular we will do some customization to help understanding how the template inheritance works and how to add new stuff to your GeoNode. The changes will include the home page, the top menu, the footer and a generic GeoNode page.

**Homepage:**

The geonode-project provides some predefined templates to change the home page and the general site content.

In the “my_geonode/my_geonode/templates” directory we can edit the site_index.html.

Try to edit the content of the “jumbotron” box in the page, save and refresh your browser to see the changes.

The theme:
To change the theme of our geonode-project we can act on the site_base.css file available in the “my_geonode/my_geonode/static/css” folder.

The file is empty so we can inspect elements of the home page with the browser’s developer tools and define css rules in there.

For example, if we want to change the background of the jumbotron, in this file we can add

```
.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.
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.

```
mkdir -p my_geonode/templates/layers/

cp geonode/geonode/layers/templates/layers/layer_list.html my_geonode/templates/layers/

vim my_geonode/templates/layers/layer_list.html
```

For example change in page title to be:

```
<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',
```

(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.name)

    def ready(self):
        super(AppConfig, self).ready()
        run_setup_hooks()
        patch_resource_base(self)
```

(continues on next page)
return logging.getLogger(self.__class__.__module__)

def patch_resource_base(self, cls):
    self._get_logger().info("Patching Resource Base")
    doi_help_text = _("a DOI will be added by Admin before publication.")
    doi = models.TextField(
        _("DOI"),
        blank=True,
        null=True,
        help_text=doi_help_text)
    cls.add_to_class('doi', doi)

def ready(self):
    super(AppConfig, self).ready()
    run_setup_hooks()
    from geonode.base.models import ResourceBase
    self.patch_resource_base(ResourceBase)

Note: you will need to perform migrations as follows: - Add field doi to resourcebase

Once you run python manage.py migrate:

Running migrations:
Applying announcements.0002_auto_20200119_1257... OK
Applying base.0031_resourcebase_doi... OK
Applying people.0027_auto_20200119_1257... OK

Till now, we have patched the DB. however, it is not yet sufficient as we still need to display the added field.

Let’s extend the default templates so that we can show the newly added field

**Overriding the Metadata Wizard Template Page**

Similar to what we have done before in the Templates directory, we will need to create “layouts” directory under “my_geonode/my_geonode/templates”. This directory will contain a copy from “geonode/src/geonode/geonode/layers/templates/layouts/panels.html” as follows:

```
$ mkdir -p my_geonode/templates/layouts
$ cp ~/geonode/src/geonode/geonode/layers/templates/layouts/panels.html my_geonode/...templates/layouts/panels.html
$ vim my_geonode/templates/layouts/panels.html
```

Inside panels.html, we will add a new div with text input as follows:

```html
{{ layer_form.data_quality_statement }}
</div>
</div>

<span><label for="{{ layer_form.doi|id }}">{{ layer_form.doi.label }}</label></span>

<input id="id_resource-doi" name="resource-doi" type="text" class="has-external-popover"

(continues on next page)
In addition, we will override the Layer Detail template page as follows:

```bash
mkdir -p my_geonode/templates/base
cp /home/geo/Envs/geonode/src/geonode/geonode/base/templates/base/_resourcebase_info_panel.html my_geonode/templates/base/
vim my_geonode/templates/base/_resourcebase_info_panel.html
```

```html
<dt>DOI</dt>
<dd>{{ resource.doi }}</dd>
</dl>
```

Now from the layer details page, you can see the DOI metadata entry per layer.
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:

```
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
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:

```python
vim geocollections/views.py

```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:

```python
vim geocollections/urls.py

```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:

```python
vim my_geonode/urls.py

```...
urlpatterns += [
    # include your urls here
    url(r'^geocollections/', include('geocollections.urls')),
]
...```

Enable the admin panel

We need a user interface where we can create geocollections. Django makes this very easy, we just need the admin.py file as follows:
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:

```bash
mkdir -p my_geonode/templates/geocollections/
vim my_geonode/templates/geocollections/geocollection_detail.html
```
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>](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.
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.

```python
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):
    # Set default permissions.

    self.remove_object_permissions()

    # 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
def set_permissions(self, perm_spec):
    anonymous_group = Group.objects.get(name='anonymous')
    self.remove_object_permissions()

    if 'users' in perm_spec and "AnonymousUser" in perm_spec['users']:
        assign_perm('view_geocollection', anonymous_group, self)

    if 'users' in perm_spec:
        for user, perms in perm_spec['users'].items():
            user = get_user_model().objects.get(username=user)
            assign_perm('view_geocollection', user, self)
```

(continues on next page)
if 'groups' in perm_spec:
    for group, perms in perm_spec['groups'].items():
        group = Group.objects.get(name=group)
        assign_perm('view_geocollection', group, self)

def remove_object_permissions(self):
    from guardian.models import UserObjectPermission, GroupObjectPermission
    UserObjectPermission.objects.filter(content_type=ContentType.objects.get_for_model(self), object_pk=self.id).delete()
    GroupObjectPermission.objects.filter(content_type=ContentType.objects.get_for_model(self), object_pk=self.id).delete()

Permissions logic (views.py)

We can add now a view to receive and set our permissions, in views.py:

```python
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 :(
```

(continues on next page)
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

```python
from django.conf.urls import url
from .views import GeocollectionDetail, geocollection_permissions
urlpatterns = [
    url(r'^(?P<slug>[-\w]+)/$', GeocollectionDetail.as_view(),
        name='geocollection-detail'),
    url(r'^permissions/(?P<collection_id>\d+)$',
        geocollection_permissions,
        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
```
import jsonrom tastypie.resources import ModelResource
from tastypie import fields
from tastypie.constants import ALL_WITH_RELATIONS, ALL

from geonode.api.api import ProfileResource, GroupResource
from geonode.api.resourcebase_api import ResourceBaseResource

from .models import Geocollection
class GeocollectionResource(ModelResource):
    users = fields.ToManyField(ProfileResource, attribute=lambda bundle: bundle.obj.group.group.user_set.all(), full=True)
group = fields.ToOneField(GroupResource, 'group', full=True)
resources = fields.ToManyField(ResourceBaseResource, 'resources', full=True)

class Meta:
    queryset = Geocollection.objects.all().order_by('-group')
    ordering = [ 'group' ]
    allowed_methods = [ 'get' ]
    resource_name = 'geocollections'
    filtering = {
        'group': ALL_WITH_RELATIONS,
        'id': ALL
    }

API authorization

We want the API to respect our custom permissions, we can easily achieve this by adding the following to the beginning of api.py:

vim geocollections/api.py

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:

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
vim my_geonode/urls.py

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
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:
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.

perms = {
    'users': {
        'alessio': ['view_geocollection']
    }
}

Deploy your GeoNode

So far we demonstrated how to modify, extend and style our GeoNode in dev mode but now it’s time to go on production. In this section we will clarify how to:

• commit your work on GitHub
• setup your server
• setup your GeoNode for production

Push to GitHub It is always a good practice to keep your code in a remote repository. GitHub is one of the options and is indeed the most used.

It is assumed that you already have a GitHub account and that you have git installed and configured with your name and email.

We will push only the my_geonode folder to GitHub and as we knew earlier, GeoNode for us is a dependency and we’ll just reinstall it as it is on the server.

Steps to push your code to GitHub:

• Create an empty repository in GitHub and copy it’s address
• In my_geonode, run git init to initialize an empty repository
• Add your remote repository address with git remote add yourname yourremoteaddress
• edit .gitignore adding all *.pyc files
• git add * to add all content of my_geonode
• git commit -m 'initial import' to make the initial commit
• git push yourname master to push the code to the GitHub repository

Setup the server

There are several options for deploying GeoNode projects on servers. In this section, we explain how to deploy it on Ubuntu server 18.04 using system-wide installation

Note: For quick installation, follow the INSTALLING documentation at http://docs.geonode.org/en/master/install/core/index.html

Setup our my_geonode

We need now to install the developed “my_geonode” project following these steps:

• git clone from your repository (in the folder of your preference)
• sudo pip install -e my_geonode
• edit the settings where needed
• edit /etc/apache2/sites-enabled/geonode.conf replacing the wsgi path to the my_geonode/my_geonode/wsgi.py file
• add the apache rights to the “my_geonode” folder with a directory like

```html
<Directory "/path/to/my_geonode/">
  Order allow,deny
  Require all granted
</Directory>
```

• Test your server.

This documentation helps developers to install GeoNode-Core and GeoNode-Project from different scenarios. GeoNode-Project can be installed on top of GeoNode-Core if already installed. Also GeoNode-Project can be installed from scratch as it has GeoNode-Core as a prerequisite.
## HTTP Routing Table

<table>
<thead>
<tr>
<th>Route</th>
<th>Status Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>GET /api/v2/</td>
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</tr>
<tr>
<td>GET /api/v2/categories/</td>
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<tr>
<td>GET /api/v2/datasets/{id}/maps/</td>
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<tr>
<td>GET /api/v2/datasets/{id}/{field_name}/</td>
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<td>POST /api/v2/management/commands/{cmd_name}/</td>
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690
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