1 Table of contents

1.1 What is GeoNode .................................................. 2
  1.1.1 Showcase .................................................. 2
  1.1.2 Most useful links ......................................... 2
1.2 Licensing ......................................................... 3
1.3 Current Version and Features ................................ 3
1.4 Get in touch with the community ............................ 3
1.5 Roadmap .......................................................... 3
1.6 GeoNode Basics .................................................. 4
  1.6.1 With GeoNode, non-specialized users can share data and create interactive maps. 4
  1.6.2 Geospatial data storage ................................... 4
  1.6.3 Data mixing, maps creation ............................... 6
  1.6.4 GeoNode as a building block ............................. 6
  1.6.5 Convinced! Where do I sign? ......................... 8
1.7 Supported Browsers ............................................. 8
1.8 Online Demo ..................................................... 9
1.9 Quick Installation Guide ....................................... 10
  1.9.1 Quick Installation Guide ................................ 10
1.10 GeoNode Users Guide .......................................... 12
  1.10.1 Accounts and User Profile ............................... 12
  1.10.2 Interacting with Users and Groups ..................... 21
  1.10.3 Data .......................................................... 31
  1.10.4 Managing Documents .................................... 41
  1.10.5 Managing Layers ........................................ 62
  1.10.6 Managing Maps ........................................... 109
  1.10.7 Publishing Data .......................................... 165
  1.10.8 Using GeoNode with Other Applications ............... 167
  1.10.9 Dynamic Extra Metadata ................................. 183
1.11 GeoNode Basic Installation .................................. 189
  1.11.1 Overview .................................................. 189
  1.11.2 First Step: Deploy GeoNode on a local server (e.g.: http://localhost/) 189
  1.11.3 Second Step: Deploy GeoNode on a production server (e.g.: https://my_geonode.geonode.org/) 193
  1.11.4 Third Step: Customize .env to match your needs ....... 197
  1.11.5 Fourth Step: Secure your production deployment; change the admin passwords and OAUTH2 keys .......... 198
  1.11.6 Further Production Enhancements ....................... 204
1.12 GeoNode Advanced Installation .............................. 213
  1.12.1 GeoNode Core ............................................. 213
  1.12.2 GeoNode Project .......................................... 267
1.13 GeoNode Settings ................................................ 276
<p>| 1.13.1 | Settings | 276 |
| 1.14 | Customize the Look and Feel | 323 |
| 1.14.1 | GeoNode Themes | 323 |
| 1.14.2 | Theming your GeoNode Project | 323 |
| 1.15 | GeoNode permissions | 330 |
| 1.15.1 | Permissions | 330 |
| 1.16 | Read-Only and Maintenance Mode | 333 |
| 1.16.1 | Read-Only and Maintenance Modes | 333 |
| 1.17 | Harvesting resources from remote services | 335 |
| 1.17.1 | Harvesting resources from remote services | 335 |
| 1.18 | Monitoring | 343 |
| 1.18.1 | Monitoring | 343 |
| 1.18.2 | Monitoring: API | 362 |
| 1.18.3 | Monitoring: User Analytics | 384 |
| 1.18.4 | Monitoring: Notifications | 397 |
| 1.18.5 | Web API | 398 |
| 1.19 | GeoNode Backup and Restore | 408 |
| 1.19.1 | Full GeoNode Backup &amp; Restore | 408 |
| 1.20 | GeoNode Components and Architecture | 437 |
| 1.20.1 | OAuth2 Security: Authentication and Authorization | 437 |
| 1.21 | Hardening GeoNode | 482 |
| 1.21.1 | Publish on other than HTTP port (for e.g. 8082) | 482 |
| 1.22 | Social Login | 483 |
| 1.22.1 | GeoNode Social Accounts | 483 |
| 1.23 | GeoNode Contrib Apps | 504 |
| 1.23.1 | Geonode auth via LDAP | 504 |
| 1.23.2 | Geonode Logstash for centralized monitoring/analytics | 509 |
| 1.24 | GeoNode Admins Guide | 517 |
| 1.24.1 | Accessing the panel | 517 |
| 1.24.2 | Reset or Change the admin password | 518 |
| 1.24.3 | Simple Theming | 518 |
| 1.24.4 | Add a new user | 525 |
| 1.24.5 | Activate/Disable a User | 528 |
| 1.24.6 | Change a User password | 528 |
| 1.24.7 | Promoting a User to Staff member or superuser | 531 |
| 1.24.8 | Creating a Group | 531 |
| 1.24.9 | Managing a Group | 538 |
| 1.24.10 | Group based advanced data workflow | 545 |
| 1.24.11 | Manage profiles using the admin panel | 547 |
| 1.24.12 | Manage datasets using the admin panel | 548 |
| 1.24.13 | Manage the maps using the admin panel | 548 |
| 1.24.14 | Manage the documents using the admin panel | 551 |
| 1.24.15 | Manage the base metadata choices using the admin panel | 551 |
| 1.24.16 | Announcements | 557 |
| 1.24.17 | Menus, Items and Placeholders | 562 |
| 1.24.18 | OAuth2 Access Tokens | 565 |
| 1.25 | GeoNode Management Commands | 570 |
| 1.25.1 | Migrate GeoNode Base URL | 570 |
| 1.25.2 | Update Permissions, Metadata, Legends and Download Links | 572 |
| 1.25.3 | Loading Data into GeoNode | 577 |
| 1.25.4 | Thesaurus Import and Export | 607 |
| 1.25.5 | Create Users and Super Users | 607 |
| 1.25.6 | Batch Sync Permissions | 611 |
| 1.25.7 | Delete Certain GeoNode Resources | 613 |</p>
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.25.8</td>
<td>Async execution over http</td>
<td>615</td>
</tr>
<tr>
<td>1.26</td>
<td>Changing the default Languages</td>
<td>623</td>
</tr>
<tr>
<td>1.26.1</td>
<td>Changing the Default Language</td>
<td>623</td>
</tr>
<tr>
<td>1.26.2</td>
<td>GeoNode Configuration</td>
<td>623</td>
</tr>
<tr>
<td>1.26.3</td>
<td>Additional Steps</td>
<td>623</td>
</tr>
<tr>
<td>1.26.4</td>
<td>Restart</td>
<td>624</td>
</tr>
<tr>
<td>1.27</td>
<td>GeoNode Upgrade from older versions</td>
<td>624</td>
</tr>
<tr>
<td>1.27.1</td>
<td>Upgrade from 3.2.x / 3.3.x</td>
<td>624</td>
</tr>
<tr>
<td>1.28</td>
<td>GeoNode Async Signals</td>
<td>626</td>
</tr>
<tr>
<td>1.28.1</td>
<td>Supervisord and Systemd</td>
<td>626</td>
</tr>
<tr>
<td>1.28.2</td>
<td>Celery</td>
<td>626</td>
</tr>
<tr>
<td>1.28.3</td>
<td>Rabbitmq and Redis</td>
<td>626</td>
</tr>
<tr>
<td>1.28.4</td>
<td>How to: Async Upload via API</td>
<td>626</td>
</tr>
<tr>
<td>1.29</td>
<td>GeoNode Add a thesaurus</td>
<td>628</td>
</tr>
<tr>
<td>1.29.1</td>
<td>Introduction</td>
<td>628</td>
</tr>
<tr>
<td>1.29.2</td>
<td>Upload via the Admin panel</td>
<td>628</td>
</tr>
<tr>
<td>1.29.3</td>
<td>Import via the load_thesaurus command</td>
<td>629</td>
</tr>
<tr>
<td>1.29.4</td>
<td>Configure a thesaurus in GeoNode</td>
<td>629</td>
</tr>
<tr>
<td>1.29.5</td>
<td>Apply a thesaurus to a resource</td>
<td>631</td>
</tr>
<tr>
<td>1.29.6</td>
<td>Exporting a thesaurus as RDF via the dump_thesaurus command</td>
<td>631</td>
</tr>
<tr>
<td>1.30</td>
<td>Participate in the Discussion</td>
<td>632</td>
</tr>
<tr>
<td>1.30.1</td>
<td>Join the community, ask for help or report bugs</td>
<td>632</td>
</tr>
<tr>
<td>1.31</td>
<td>Write Documentation</td>
<td>632</td>
</tr>
<tr>
<td>1.31.1</td>
<td>How to contribute to GeoNode’s Documentation</td>
<td>632</td>
</tr>
<tr>
<td>1.32</td>
<td>Provide Translations</td>
<td>635</td>
</tr>
<tr>
<td>1.32.1</td>
<td>Contribute to Translations</td>
<td>635</td>
</tr>
<tr>
<td>1.33</td>
<td>Write Code</td>
<td>641</td>
</tr>
<tr>
<td>1.34</td>
<td>Frontend Development</td>
<td>641</td>
</tr>
<tr>
<td>1.34.1</td>
<td>Frontend development</td>
<td>641</td>
</tr>
<tr>
<td>1.35</td>
<td>API Schema</td>
<td>642</td>
</tr>
<tr>
<td>1.35.1</td>
<td>GeoNode API Schema</td>
<td>642</td>
</tr>
<tr>
<td>1.36</td>
<td>How to Develop</td>
<td>671</td>
</tr>
<tr>
<td>1.36.1</td>
<td>Start to develop with Docker</td>
<td>671</td>
</tr>
<tr>
<td>1.36.2</td>
<td>How to Install GeoNode-Core for development</td>
<td>673</td>
</tr>
<tr>
<td>1.36.3</td>
<td>How to run GeoNode Core for development</td>
<td>682</td>
</tr>
<tr>
<td>1.36.4</td>
<td>How to run GeoNode Project for development</td>
<td>682</td>
</tr>
<tr>
<td>1.36.5</td>
<td>Start MapStore2 client in development mode</td>
<td>683</td>
</tr>
<tr>
<td>1.36.6</td>
<td>Workshops</td>
<td>684</td>
</tr>
</tbody>
</table>

HTTP Routing Table 705
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](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/](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
Designed to be extended and modified; it can even be integrated into existing platforms.

METADATA
Specialized tools to analyze geospatial data.
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.
Note: The vast majority of GeoNode developers prefer using Google Chrome.

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/.

![Fig. 2: Online Demo @ master.demo.geonode.org](image)

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.

![Docker Containers Diagram]

1.9. **Quick Installation Guide**
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, layers and documents. In order to create maps, add layers or documents, edit the data and share these resources with other users, you need to sign in.

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

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

Creating a New Account

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

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

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

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

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.
1. GeoNode Users Guide

1.1. Sign up

Create a new local account

**E-mail**
john.smith@mail.com

**Username**
johnsmith

**Password**
********

**Password (again)**
********

Sign up

---

Fig. 3: Sign in screen

---

Fig. 4: Registering for a new account

---

Fig. 5: Alerts
1.10. GeoNode Users Guide

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, it is accessible from the user menu.

So, click on your user name in the top right of the screen. A drop-down list will show. Click on Profile to enter the Profile settings page.

![Fig. 8: Link to your profile](image)

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

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

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

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

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

Click the Delete from Favorites button to remove the resource from the list.

The My Activities link allows to see all your recent activities on GeoNode such as layers uploading and maps creation.

This link is also available in the user menu.

All other links and their functionalities will be described in depth in the following sections.
Fig. 9: *User profile page*
Fig. 10: Favorites

Fig. 11: Recent activities
**Editing Profile Information**

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

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

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

**Connecting your Account with Social Networks**

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

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

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

By clicking on Associated e-mails of the Profile page (see Updating the Profile), you will have the possibility to fill up a new e-mail address. Type it in the E-mail input field then click on Add E-mail to perform a new association.

You can make it primary if necessary, in order to receive the notification on this address. To do that, select the e-mail that you want, then click on Make Primary.

**Managing the Password**

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

If no errors occur you will see a confirmation message.

Next time you log in you will have to use the new password.

**Setting Notification Preferences**

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

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

Now check/uncheck the notification types you wish to receive or not receive. It is possible to be notified for the events shown in the picture below.
Fig. 12: Updating Profile information
Fig. 13: Updating Profile correctly finalized

Fig. 14: Accounts e-mail

Fig. 15: New e-mail association

Fig. 16: Primary e-mail address
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.
### Notifications Settings

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

---

**Fig. 19: Notifications settings**

---

1.10. **GeoNode Users Guide**
Invite Users

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

Fig. 20: Invite users to join GeoNode

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

Fig. 21: Invitations confirm message

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.

Fig. 22: About menu - People link

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

The Search tool is very useful in case of many registered users, type the name of the user you are looking for in the input text field to filter the users list.
Select a user and click on its username to access to the user details page.
Fig. 23: List of the registered users
### User details

**Mario Rossi (mariorossi)**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>Not provided.</td>
</tr>
<tr>
<td>Organization</td>
<td>Mario Rossi Transport</td>
</tr>
<tr>
<td>Location</td>
<td>Not provided.</td>
</tr>
<tr>
<td>Voice</td>
<td>Not provided.</td>
</tr>
<tr>
<td>Fax</td>
<td>Not provided.</td>
</tr>
<tr>
<td>Description</td>
<td>Not provided.</td>
</tr>
<tr>
<td>Keywords</td>
<td>Not provided.</td>
</tr>
</tbody>
</table>

#### Resources

**Tuscany roads**

- **Roads of Tuscany**
- Created by: Mario Rossi
- Date: 3 Jun 2019
- Views: 0
- Downloads: 0
- Favorites: 0
- **View Map**

**roads**

- **No abstract provided**
- Created by: Mario Rossi
- Date: 3 Jun 2019
- Views: 0
- Downloads: 0
- Favorites: 0
- **Create a Map**

---

Fig. 24: *User details*
In this page the main information about the user are shown: personal information (name, surname, organization and so on...) and the resources the user owns (layers, maps and documents).

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

![User activities](image)

**Fig. 25: User activities**

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

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

![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 layers or those related to maps or comments by switching the tabs.
Fig. 27: Recent Activities
**Contacting other users**

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

![Create Message](Image)

**Fig. 28: Send message to users and groups**

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

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

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

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

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

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

You can open the Conversation details by clicking on the Subject link.
Fig. 31: *Inbox page*

Fig. 32: *All your conversations*

Fig. 33: *A reply to your message*
As you can see in the picture above, in the Conversation page you have the ability to write a quick reply. Type your message in the text box and click on Send Reply to do that.

In the Inbox page there is also the Create Message button that provides you a quick link to the message creation form.

### 1.10.3 Data

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

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

#### Data Types

GeoNode welcome page shows a variety of information about the current GeoNode instance. You can explore the existing data using many search tools and filters (see Finding Data) or through the links of the navigation bar at the top of the page.

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

1. Documents
2. Layers
3. Maps

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

The Maps menu let you to manage maps.
Documents

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

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

Layers

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

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

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

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

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

Finding Data

This section will guide you to navigate GeoNode to find layers, maps and documents by using different routes, filters and search functions.

In Home page you can find some quick search tool.

The Search box in the navigation bar (see the picture below) let you type a text and find all the data which have to deal with that text.

Fig. 37: Search tool in GeoNode welcome page

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

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

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

Data can be ordered by date, name and popularity.

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

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

The Search page, which you will be redirected to, will have the TEXT filter already set with the name you have typed in the search box (see the picture below). If you want to reach the Search page directly, without any input text, you can click the Advanced Search link.
Fig. 38: The Search page
Fig. 39: Search filter by EXTENT

Fig. 40: Ordering Data
Fig. 41: Searching for data

Fig. 42: Results of searching made by name
• In the Home page section shown below are listed all the categories available in the GeoNode instance you are using. You can search for data by category by clicking on it.

![Discover the available datasets.]

Fig. 43: Searching for datasets by category

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

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

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

**Documents**

When you are searching for Documents you can:

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

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

**Layers**

To find Layers you can:

- use the Layers quick link of the Featured Datasets
- click on the Layers link of the Data menu in the navigation bar

In the Layers search page only Layer will be considered as data type. You can set one or more filter to refine the search. In the example below the layers have been filtered by EXTENT and CATEGORIES.
Fig. 44: Results of searching made by category
Fig. 45: Featured Datasets

Fig. 46: Link for Documents
Fig. 47: *Documents filtered by categories*

Fig. 48: *Link for Layers*

Fig. 49: *Layers filtered by extent*
Maps

If you are searching for Maps you can:

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

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

1.10.4 Managing Documents

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

You will learn how to upload a document and how to inspect its metadata and details. All the editing tools will be also explained.

Uploading Documents

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

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

Documents uploading is accessible from two positions:

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

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

In order to upload a document:

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

2 Documents found

Add documents through the "checkboxes".

Fig. 52: Documents Upload button

Fig. 53: Document Upload link
4. click the red *Upload* button

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

## Filling the Document Metadata

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

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

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

**Fig. 55: Document Basic Metadata**

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

**Note:** When a document is linked to some resources, you can see that link on the *Resource Page.*
Fig. 56: *Documents linked to a Layer*

It will be also visible on the *Document Information* page.
2. On the **Location and Licenses** page, the following information should be filled:

   - The *Language* of the document;
   - The *Regions*, which informs on the spatial extent covered by the document. Proposed extents cover the following scales: global, continental, regional, national;
   - The *Data Quality statement* (general explanation of the data producer’s knowledge about the lineage of a dataset);
   - Potential *Restrictions* to sharing the document should be provided in the Restrictions box.

   Click on the blue button *Next >*> to go ahead to the next step.

3. On the **Optional Metadata** page, complementary information can be added:

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

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

   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. 58: Document Location and Licenses
Fig. 59: Document Optional Metadata
Document Information

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

![Document Information page](image)

Fig. 60: Document Information page

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

There is a Tab Section below the document, where you can first view Info about the document.

The Info Tab section shows the document metadata such as its title, abstract, date of publication etc. The metadata also indicates the user who is responsible for uploading and managing this content, as well as the group to which it is linked.

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

![Info Tab, Share Tab, Ratings Tab, Comments Tab, Favorite Tab]

Share This Document

- Email
- Facebook
- Twitter
- Google +

Fig. 61: Document Sharing

You can Rate the document through the Ratings system.

![Info Tab, Share Tab, Ratings Tab, Comments Tab, Favorite Tab]

Rate this document

★ ★ ★ ★ ★

Average Rating

★ ★ ★ ★ ★ (1)

Fig. 62: Rate the Document

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

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

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

GeoNode also supports the EXIF (EXchangeable Image Format) for jpeg and tiff image documents. The EXIF means that additional information (metadata) are stored within the image, so GeoNode allows you to see those information in the Exif Tab.
Fig. 63: Document Comments

![Image of GeoNode interface with add comment options]

Fig. 64: Your Comment

![Image of GeoNode interface with comments listed]
Fig. 65: *Your Favorite Comment*

Fig. 66: *The EXIF tab*
The Tools Section

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

In the same section of the Document Page you can find the following useful tool:

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

![Download Metadata](image.png)

Fig. 68: Document Metadata download

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

Exploring Metadata Details

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

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

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

**Identification**

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

**Owner**

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

**Information**

**Spatial Extent**

- **Projection System:** EPSG:4326
- **Extension x0:** 313217.9515000000000000
- **Extension y0:** 393084.5615000000000000
- **Extension x1:** 5219061.9220000000000000
- **Extension y1:** 5219061.9220000000000000

**Features**

- **Restrictions:** exclusive right to the publication, production, or sale of the rights to a literary, dramatic, musical, or artistic work, or to the use of a commercial print or label, granted by law for a specified period of time to an author, composer, artist, distributor
- **Language:** English
- **Data Quality:** good
- **Supplemental Information:** No information provided

**Contact Points**

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

**References**

- **Link Online:** /documents/37
- **Metadata Page:** /documents/37/metadata_detail
- **Online Link:** /documents/37/download

**Hosted Document**

- **Old Italian Boundaries.jpg**
- **Old Italian Boundaries.png**

**Metadata Author**

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

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1.10. GeoNode Users Guide

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Fig. 69: Document Metadata Details page
Document Editing

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

![Document Editing panel](image)

**Fig. 70: Document Editing panel**

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

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

![Remove Document](image)

**Fig. 71: Document Removal confirmation**

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

Setting the Document Thumbnail

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

If no errors occur the following message will be shown.
Fig. 72: *Upload Document’s Thumbnail*

Fig. 73: *Uploading success*
Editing the Document Metadata

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

![Edit Document](Image)

Fig. 74: Editing Metadata

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

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

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

Changing the Document Permissions

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

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

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

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

See an example in the picture below.

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

#### Metadata Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Main title of the document</td>
</tr>
<tr>
<td>Description</td>
<td>A brief description of the content</td>
</tr>
<tr>
<td>Keywords</td>
<td>Keywords associated with the document</td>
</tr>
<tr>
<td>Language</td>
<td>Language of the document</td>
</tr>
<tr>
<td>Rights</td>
<td>Intellectual property rights</td>
</tr>
<tr>
<td>Publisher</td>
<td>Name of the publisher</td>
</tr>
<tr>
<td>Date</td>
<td>Date of publication</td>
</tr>
<tr>
<td>Coverage</td>
<td>Geographic extent of the content</td>
</tr>
<tr>
<td>Source</td>
<td>Source of the content</td>
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#### Document Links

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Fig. 76: *The button to change permissions*
Fig. 77: Changing the Document permissions
Once the permissions are set, click *Apply changes* to save them.

### 1.10.5 Managing Layers

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

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

**Layers Uploading**

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

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

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

![Link for Layers Uploading](image)

**Fig. 78: Link for Layers Uploading**

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

![Button for Layers Uploading](image)

**Fig. 79: Button for Layers Uploading**

The *Layers Uploading* page looks like the one in the picture below.
Fig. 80: The Layers Uploading page

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

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

Fig. 81: Shapefile Uploading

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

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

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

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

![Create layer link](image1)

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

- Name
- Title
- Geometry type

![Geometry types](image2)

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

![New Layer creation from scratch](image3)

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

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

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

Let’s try it!

Click on the Remote Services link of the Data menu in the navigation bar.

![Remote Services link](image)

The page that opens will contain the list of the available services.

![Remote Services](image)

To configure a new service:

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

GeoNode supports three types of remote services:
• **Web Map Service**

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

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

• **GeoNode Web Map Service**

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

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

• **ArcGIS REST MapServer**

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

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

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

**Fig. 88: A new Remote Service**

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

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

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

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

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

You can set the following types of permissions:

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

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

Click on Apply Changes to save these settings.
Fig. 90: Change Layer Permissions
Fig. 91: Layer Permissions settings for users and groups
Layer Information

In this section you will learn more about layers. In the Layers section we explain how to find layers, now we want to go more in depth showing you how to explore detailed information about that. From the layers list page, click on the layer you are interested in. The Layer Page will open.

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

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

Layer Preview

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

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

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

Tabs Sections

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

• The tab Info is active by default. This tab section shows some layer metadata such as its title, the abstract, date of publication etc. The metadata also indicates the layer owner, what are the topic categories the layer belongs to and which regions are affected.
• The Attributes tab shows the data structure behind the layer. All the attributes are listed and for each of them some statistics (e.g. the range of values) are estimated (if possible).
• The Share tab provides the links for the layer to share through social media or email.
• You can Rate the layer through the Rating system.
• In the Comments tab section you can post your comment. Click on Add Comment, insert your comment and click Submit Comment to post it.

Your comment will be added next to the last already existing comment. If you want to remove it click on the red Delete button.
• If you want this layer in your Favorites (see Updating the Profile), open the Favorite tab and click on Add to Favorites.
Fig. 93: *Layer Preview*

![Layer Preview](image)

### GeoNode Info

**Title**: Regioni Italiane  
**License**: Not Specified  
**Abstract**: No abstract provided  
**Publication Date**: June 7, 2019, 4:49 a.m.  
**Type**: Data  
**Keywords**: features, Reg2015_WGS84_g  
**Category**: Environment  
**Regions**: Global, Africa, Central Africa, North Africa, Algeria, Tunisia, Europe, Albania, Austria, Bosnia and Herzegovina, Croatia, France, Greece, Holy See (Vatican City), Hungary, Italy, Liechtenstein, Malta, Monaco, Montenegro, San Marino, Serbia, Slovenia, Switzerland, Pacific  
**Owner**: johnsmith  
**More Info**:  
**Language**: English  
**Supplemental Information**: No information provided

Fig. 94: *Layer Info tab*
Italian Towers

Fig. 95: *Layer Attributes tab*

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Share This Layer

- Email
- Facebook
- Twitter
- Google +

Fig. 96: *Layer Sharing*
Rate this layer

Average Rating

(2)

Fig. 97: Rate the Layer

Comments (1 total)

Very interesting layer
By Johnsmith on Jun 7, 2019

Add Comment

Delete

Fig. 98: Layer Comments

Favorite

Add to Favorites

Go to Favorites

Fig. 99: Your Favorite Layer
Layer Tools

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

- through the Download Layer button you can download your layer with some options, see Downloading Layers;
- the Metadata Detail button to see the layer metadata, see Layers Metadata to read more;
- the Editing Tools button allows you to access to many editing tools. Those functionalities will be explained in the Layer Editing section;
- the View Layer button opens the layer loaded in a map, see the Map Information for more details;
- the Download Metadata button allows you to download the layer metadata in various formats;
- the Legend shows what the symbols and styles on the map are referring to;
- in the Map using this layer section all the map which uses the layer are listed;
- in the Create a map using this layer, the Create a Map button allows you to create a map from scratch using the layer;
- the section Add the layer to an existing map shows you a dropdown menu in which all the maps the user can view are listed. The button Add to Map allows you to add the layer to the map you have selected in the previous menu;
- the Styles section shows all the styles associated with the layer. Click on the checkbox corresponding to one of the styles listed to apply it the preview;
- in the Refresh Attributes and Statistics of this layer section the Refresh Attributes and Statistics allows GeoNode to refresh the list of available Layer Attributes. If the option ‘WPS_ENABLED’ has been also set on the backend, it will recalculate their statistics too;
- in the Clear the Server Cache of this layer section the Empty Tiled-Layer Cache allows to wipe the tile-cache of this layer;
- the About section shows you the layer Owner, the Contact user and the Metadata Author.

Downloading Layers

At the top of the Layer Page there is the Download Layer button (see Layer Information). It provides access to the ability to extract geospatial data from within GeoNode. You will see a list of options of the supported export formats. You can choose the Images formats PNG, PDF, JPEG if you want to save a “screenshot-like” image of the layer.

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

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

Fig. 100: Change the Layer Style in preview
Download Layer

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<tbody>
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<tr>
<td>PDF</td>
<td></td>
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<tr>
<td>JPEG</td>
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Fig. 101: *Downloading Layers as Images*

Download Layer

| Images | Data |

Do you want to filter it?

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

Fig. 102: *Downloading the Layer Data*

Fig. 103: *Downloading the Layer Data*
Layer Editing

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

In that panel you can see many options grouped by four categories:

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

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

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

![Fig. 105: The Layer Editing panel](image)

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

Replacing the Layer

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

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

We have replaced the roads dataset with the railways one. You can see the differences in the Layer Preview.
GeoNode Documentation, Release 3.2.1

**Upload a Thumbnail**

![Upload a Thumbnail panel](image)

Fig. 106: *The Upload Thumbnail panel*

**Replace a Layer**

![Replace a Layer panel](image)

Fig. 107: *Replace a Layer*
Fig. 108: Replace Layer success
roads

Fig. 109: Result of the Layer Replacement
Append Data to Layer

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

Fig. 110: Append to a Layer

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

We have append the layer_name dataset to the existing one. You can see the differences in the Layer Preview.

Editing the Layer Data

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

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

Click the Edit Mode button to start an editing session.

Now you can:

• Add new Features
Append to Layer [Layer Name]

![Drop files here](image)

or select them one by one:

- Choose Files

Files to be uploaded

ESRI Shapefile

- dbf Remove
- prj Remove
- shp Remove
- shx Remove

Your layer was successfully updated

- Layer Info
- Edit Metadata
- Upload Metadata
- Manage Styles

Fig. 111: Replace Layer success
Through the Add New Feature button it is possible to set up a new feature for your layer. Fill the attributes fields and click to save your change. Your new feature doesn’t have a shape yet, click on to draw its shape directly on the Map then click on to save it.

Fig. 113: Add a New Feature to the Layer

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. 114: Delete a 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.
Fig. 115: Feature Shape Editing - Change the existing shape

Fig. 116: Feature Shape Editing - Add parts to the existing shape

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

Fig. 117: Feature Attributes Editing

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

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

**Layers Metadata**

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

The *Layer Metadata* page will be displayed.

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

- **Identification** to uniquely identify the layer (Title, Abstract, Publication Date etc.);
- **Owner**, the user who owns the layer;
- **Information**, the Identification Image, the Spatial Extent, Projection System and so on;
- **Features**, Language, Supplemental and other Information;
- **Contact Points**, the available user to get in contact;
- **References**, various links to the resource information and data;
- **Metadata Author**, information about the author of the metadata.

**Downloading Metadata**

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

The available download formats are grouped in three categories:

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

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

Fig. 118: *The Layer Metadata Detail button*
Fig. 119: The Layer Metadata Details
Fig. 120: How to Download Metadata
Metadata Wizard

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

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

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

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

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

**Fig. 121: Basic Layer Metadata**

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

- The **Thumbnail** of the layer (click *Edit* to change it);
- The **Title** of the layer, which should be clear and understandable;
- An **Abstract**; brief narrative summary of the content of the Layer
Note: The Abstract panel allows you to insert HTML code through a wysiwyg text editor

- The Creation/Publication/Revision Dates which define the time period that is covered by the layer;
- The Keywords, which should be chosen within the available list. The contributor search for available keywords by clicking on the searching bar, or on the folder logo representing, or by entering the first letters of the desired word;
- The Category which the layer belongs to;
- The Group which the layer is linked to.

• Location and Licenses

Fig. 122: Location and Licenses Metadata for Layers

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

- The Language of the layer;
– The License of the dataset;
– The DOI of the dataset; if available, this represents the Digital Object Identifier of the resource
– The Attribution of the dataset; authority or function assigned, as to a ruler, legislative assembly, delegate, or the like
– The Regions, which informs on the spatial extent covered by the layer. Proposed extents cover the following scales: global, continental, regional, national;
– The Data Quality statement (general explanation of the data producer’s knowledge about the lineage of a dataset);
– Potential Restrictions on layer sharing.

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

### Optional Metadata

Complementary information are:

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

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

### Dataset Attributes

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

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

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

By using the keyword **${properties.<attribute_name>**, you can tell to GeoNode to render the actual value of the attribute on the map.
Fig. 123: *Optional Layer Metadata*
Fig. 124: Dataset Attributes Metadata for Layers
Fig. 125: Use a custom template
As an instance, the example below

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

**Fig. 126: Use a custom template: HTML**

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

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

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

### Metadata Advanced Editing

In the Layer Editing panel the Advanced Edit is also available.

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

### Uploading Metadata

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

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

Fig. 127: *Use a custom template: Get Feature Info outcome*

Fig. 128: *Completeness Progress Bar*
1.10. GeoNode Users Guide

Fig. 129: The Advanced Edit button

Fig. 130: The Metadata Advanced Editing page
Layer Styling

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

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

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

Fig. 131: Default Style for Layers
Creating new Styles

In order to create a new style, open the Layer Page (see Layer Information) and click on Editing Tools. Then click the Edit button in the Styles section of the Layer Editing panel (see the picture below).

![Edit Styles button](image)

The Layer will open in a new Map. The Styles Panel will show you all the available styles for the layer and some useful tools.

Now follow the steps below:

1. Click the ![button](image). The Style Templates Panel will open.

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

3. Click the ![button](image) to add the Style Template to the styles list.

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

The style you have created is now added to the Styles List.

You will also see this new style in the Layer Page.

Now you can switch the style by clicking on the corresponding checkbox.
It would be nice to change the style in order to decrease the opacity of the filling color as well as to reduce the lines width. The embedded MapStore makes available a powerful Style Editor to accomplish that tasks. In the next paragraph we will explain how.

**Editing the Layer Style**

The following steps show you how to edit styles:

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

2. Click on

3. Open the *Style* tab

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

4. Select the *Style* and click on

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

6. Click on to save your changes.

See the following gif to recap the whole process.
Fig. 134: Create new Styles
Fig. 135: Style Templates

Create new style

Title
- Waterway

Abstract
- A style for waterways

Save

Fig. 136: Title and Abstract for new Styles
You can also decide to make your new style the Default Style of that layer. Click on \( \star \) to do that.

Click on \( \times \) to delete the style.

**Uploading Styles**

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

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

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

1. Click the Upload button of the Styles section

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

3. Click on Upload files

Once the process has been finished the new Style will be visible in the Layer Page.
Fig. 138: The Layer Page with the new Style
Fig. 139: The Style Editor Syntax Validation

Fig. 140: The Style Editor

Fig. 141: Upload Styles button
Managing Styles

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

In that page you can:

- See the Layer Name
- Add/remove styles to/from the Available styles list
- Choose the Layer Default Style from the Available styles list

Click on Update Available Styles to save your changes.

Advanced Layer Management with MapStore

GeoNode provides the user with some advanced features for layer manipulation such as layer filtering, attribute edition and layer 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 Layers**

With GeoNode you can filter a layer via its attributes, direct map filter by drawing an area of interest over the map canvas and via cross-layer 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 layers displayed together on an interactive web map. Maps can be composed in the map composer and saved as GeoNode resources. Maps can also be associated with metadata, ratings, and comments.

In this section, you will learn how to create a new map and share it.

Creating Maps

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

In order to create new maps you can use:

- the Create Map link of the Maps menu in the navigation bar

![Fig. 144: The Create Map link](image)

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

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

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

The TOC component makes possible to manage layers overlap on the map by shifting their relative positions in the list (drag and drop them up or down in the list). It also allows to hide/show layers ( and ), to zoom to layers extents ( ) and to manage their properties ( ).

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

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

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

Fig. 145: The Create Map button

Fig. 146: The Create New Map button
Map Information

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

The Map Page is divided into three main sections:

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

Map Preview

The Map Preview shows the Map with very basic functionalities:

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

See the MapStore Documentation to learn more.
My New Map

Fig. 149: The Map Information page

Fig. 150: Map Preview
Tabs Sections

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

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

![Map Information Tab](image1)

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

![Map Sharing Tab](image2)

Share This Map

- Email
- Facebook
- Twitter
- Google+

![Map Sharing](image3)

- You can Rate the map through the Rating system.
- In the Comments tab section you can post your comment. Click on Add Comment, insert your comment and click Submit Comment to post it.

  Your comment will be added next to the last already existing comment. If you want to remove it click on the red Delete button.
- If you want this map in your Favorites (see Updating the Profile), open the Favorite tab and click on Add to Favorites.
Rate this Map

Average Rating

Fig. 153: Map Rating

Comments (1 total)

Great Map!
By johnsmith on Jun 12, 2019

Add Comment

Delete

Fig. 154: Map Comments

Favorite

Add to Favorites

Go to Favorites

Fig. 155: Your Favorite Maps
Map Tools

In the right side of the Map Information page there are some tools that can help you to manage your maps. In this paragraph you will learn how to discover and retrieve information about maps.

The following is a list of actions you can take in order to accomplish this task:

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

Maps Metadata

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

![Image of GeoNode interface with Map Metadata Detail button highlighted]

Fig. 156: The Map Metadata Detail button

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

**Identification**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>My New Map</td>
</tr>
<tr>
<td>License</td>
<td>Not Specified</td>
</tr>
<tr>
<td>Publication Date</td>
<td>June 12, 2019, 8:17 a.m.</td>
</tr>
<tr>
<td>Regions</td>
<td>Global, Africa, Central Africa, West Africa, Pacific, Kiribati</td>
</tr>
<tr>
<td>Approved</td>
<td>Yes</td>
</tr>
<tr>
<td>Published</td>
<td>Yes</td>
</tr>
<tr>
<td>Featured</td>
<td>No</td>
</tr>
</tbody>
</table>

**Owner**

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

**Information**

<table>
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<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial Extent</td>
<td></td>
</tr>
<tr>
<td>Projection Sys</td>
<td></td>
</tr>
<tr>
<td>Extension x0</td>
<td>-20037397.02329995535084</td>
</tr>
<tr>
<td>Extension x1</td>
<td>666726.142827000013308</td>
</tr>
<tr>
<td>Extension y0</td>
<td>-9787228.06725000012934</td>
</tr>
<tr>
<td>Extension y1</td>
<td>20607970.03299995353084</td>
</tr>
</tbody>
</table>

**Features**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>English</td>
</tr>
<tr>
<td>Supplemental Information</td>
<td>No information provided</td>
</tr>
</tbody>
</table>

**Contact Points**

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

**References**

- Link Online: /maps/47
- Metadata Page: /maps/47/metadata_detail

**Metadata Author**

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

*Fig. 157: The Map Metadata Details*
Lots of information are displayed in this page. Those information are grouped as follow:

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

**Metadata Wizard**

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

- **Basic Metadata**
  
  In the first step the system asks you to insert the following metadata (required fields are highlighted with red outlines):
  
  - The **Thumbnail** of the map (click *Edit* to change it);
  - The **Title** of the map, which should be clear and understandable;
  - An **Abstract**; brief narrative summary of the content of the Map

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

  - The **Creation/Publication/Revision Dates** which define the time period that is covered by the map;
  - The **Keywords**, which should be chosen within the available list;
  - The **Category** which the map belongs to;
  - The **Group** which the map is linked to.

  Click *Next* to go to the next step.

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

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

![Metadata for My New Map](image)

**Fig. 158:** Basic Map Metadata
Fig. 159: Location and Licenses Metadata for Maps
No further mandatory metadata are required in the next step so, once the required fields have been filled out, a green *Done* button will be visible in the screen. Click *Next >>* to go to the next step or *<< Back* to go back to the previous step.

- **Optional Metadata**

![Metadata for My New Map](image)

Fig. 160: *Optional Map Metadata*

Complementary information are:

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

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

![Completeness Progress Bar](image)

**Fig. 161: Completeness Progress Bar**

**Metadata Advanced Editing**

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

![Editing Tools](image)

**Fig. 162: The Advanced Edit button**

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

**Changing the Map Permissions**

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

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

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

Through the *Permissions Settings Panel* you can add or remove permissions for users and groups. The picture below shows an example.
Fig. 163: Change Map Permissions
Fig. 164: Map Permissions settings for users and groups
You can set the following types of permissions:

- **View** allows to view the map;
- **Download** allows to download the map;
- **Change Metadata** allows to change the map metadata;
- **Manage** allows to update, delete, change permissions, publish and unpublish the map.

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

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

**Exploring Maps**

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

![My New Map](image)

**Fig. 165: The View Map button**

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

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

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

Table of Contents (TOC)

In the upper left corner, click on to open the Table Of Contents, briefly TOC from now on, of the map. The TOC shows all the layers involved with the Map and allows to manage their properties and representations on the map. From the TOC you can:
• manage the layers Overlap;
• filter the layers list by typing text in the Filter Layers field;
• add new layers from the Catalog by clicking the Add Layer button;
• manage the layers properties such as Opacity (scroll the opacity cursor), Visibility (click on to make the layer not visible, click on to show it on map);
• manage the Layer Settings, see the next paragraph.
Select a Layer from the list and click on it, the Layer Toolbar should appear in the TOC.
The Toolbar shows you many buttons:
• allows you to zoom to the layer extent;
Fig. 167: *The Table Of Contents (TOC)*

Fig. 168: *Scrolling the Layer Opacity*
Fig. 169: *The Layer Toolbar*
drives you through the layer settings customization (see the next paragraph);

to explore the features of the layer and their attributes (more information at Attributes Table);

to delete layers (click on Delete Layer to confirm your choice);

Fig. 170: Deleting Layers

• to create Widgets (see Creating Widgets).

Managing Layer Settings

The Layer Settings panel looks like the one below.

The Layer Settings are divided in three groups:

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

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

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

The Format field allows you to change the output format of the WMS requests.
You can set a numeric value of Opacity using the corresponding input field.
You can also set the layer as Transparent, decide to Use cache options and to use Single Tile.
Fig. 171: *The Layer Settings Panel*
Fig. 172: The Layer Display Settings Panel
The third tab is the Style one. By clicking on it, an advanced Style Editor allows you to create new styles and to modify or delete an existing one. See the Layer Styling section to read more.

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.

![Fig. 173: The Attributes Table Panel](image)

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

The Attribute Tables has a row for each feature belonging to the layer and a column for each attribute that describes the feature.

Each column has a Filter input field through which you can filter the features basing on some value or expression (depending on the data type of the field).

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

Those functionalities are:

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

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

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

  ![Fig. 175: The Attributes Table Toolbar](image)

  **Fig. 175: The Attributes Table Toolbar**

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

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

As mentioned before, GeoNode allows both an attribute based and spatial filtering. When clicking on ![spatial filter icon](image-url) from the layer **Attributes Table** the **Advanced Search** panel opens and shows you three different filtering functionalities:

1. **Attribute Filter**
   - In the **Attribute Filter** section you can compose a series of conditions about the attributes of the layer. Click on ![add condition icon](image-url) 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** ![add group icon](image-url) button. Click on ![search icon](image-url) 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).

2. **Region of interest**
   - The **Region of interest** filtering allows you to filter features that have some relationship with a spatial region that you draw on the map.

3. **Layer filter**
   - The **Layer filter** allows you to select a specific layer to filter by.

Fig. 177: **Advanced Search**

- In the **Attribute Filter** section you can compose a series of conditions about the attributes of the layer. Click on ![add condition icon](image-url) 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** ![add group icon](image-url) button. Click on ![search icon](image-url) 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 **Region of interest** filtering allows you to filter features that have some relationship with a spatial region that you draw on the map.
Select the Filter Type (Circle, Viewport, Polygon or Rectangle), draw the spatial region of interest on the map, select a Geometric Operation (Intersects, Bounding Box, Contains or Is contained) and then click on search.

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

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

Creating Widgets

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

Chart Widgets

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

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.
Fig. 179: Filtering by Region Of Interest

Fig. 180: Layer Filtering
Fig. 181: Creating Widgets
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. 182: Chart Widgets

Fig. 183: Chart Widgets Creation
The green icon means that the chart is connected to the viewport.

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

![Chart Widgets Options](image)

**Fig. 184: Chart Widgets Options**

**Text Widgets**

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

The resulting widget looks like the following.

**Table Widgets**

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

So, choose what attributes you are interested in and click on .

Insert Title and Description (optional) and click on . The example below shows the Table Widget on the map.
Fig. 185: *Text Widgets Creation*

This is my Text Widget

Normal

This is the text of the Text Widget

Fig. 186: *My Text Widget*
### Fig. 187: Table Widgets Columns

<table>
<thead>
<tr>
<th>Column</th>
</tr>
</thead>
<tbody>
<tr>
<td>fid</td>
</tr>
<tr>
<td>osm_id</td>
</tr>
<tr>
<td>name</td>
</tr>
<tr>
<td>ref</td>
</tr>
<tr>
<td>type</td>
</tr>
<tr>
<td>oneway</td>
</tr>
<tr>
<td>bridge</td>
</tr>
<tr>
<td>maxspeed</td>
</tr>
</tbody>
</table>
Counter Widgets

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

Click on , insert Title and Description then click on .

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

Timeline

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

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

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

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

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

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

39.903 km/h

Fig. 189: Counter Widget Creation

Fig. 190: Counter Widget
Fig. 191: The Timeline

Fig. 192: The Time Control Buttons
In particular you can *Play* the animation by clicking ▶️, go back to the previous time instant through ◀️, go forward to next time step using ▶️ and stop the animation by clicking ■.

![Fig. 193: The Animation Control Buttons](image)

The *Timeline* panel can be expanded through the ▲ button.

![Fig. 194: The Expanded Timeline](image)

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

- the distribution of the data over time

![Fig. 195: The Timeline Histogram](image)

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

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

**Animations**

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

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

By clicking on you can manage some Animation Settings.

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

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

The *Animation Range* option lets you to define a temporal range within which the time cursor can move. See the following gif to better understand how the Animation works or take a look at the MapStore Documentation.
Fig. 198: *The Timeline Settings*

Fig. 199: *The Timeline Animation*
Options Menu Tools

At the top-right corner of the Map there is a Burger Menu button. Click on it to open the Map Options panel.

![Map Options Menu](image)

Fig. 200: The Map Options Menu

We will explain those tools more in depth in the next paragraphs.

Printing a Map

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

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;
Fig. 201: The Printing Window

- the Font Emphasis (bold, italic);
- if Force Labels;
- if use Anti Aliasing Font;
- the Icon Size;
- the Legend Resolution in dpi.

To print the map click on **Print**.

**The Layers Catalog**

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

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

**Performing Measurements**

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

To perform a measure draw on the map the geometry you are interested in, the result will be displayed on the left of the unit of measure select menu (this tool allows you to change the unit of measure also).
Fig. 202: The Layers Catalog
Fig. 203: The Measure Tool

Fig. 204: Measuring Areas
Saving a map

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

![Image of GeoNode interface with options to save a map]

Fig. 205: Saving Maps

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

Customizing The Layers' GetFeatureInfo Templates

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

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

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

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

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

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

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

The “GetFeatureInfo” output will change accordingly as shown in Fig. 3
Fig. 206: Your Map into the List

Fig. 207: Fig. 1
Fig. 208: **Fig. 2**

Fig. 209: **Fig. 3**
Simple Template: Assigning A Media-Type To Attribute Values

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

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

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

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

Selecting image as media-type (Fig. 6)
and editing the contents accordingly (Fig. 7)
you will get a nice effect as shown in Fig. 8

Advanced Template: Use A Custom HTML Template

By selecting the option Use a custom template? as shown in Fig. 9
You will be able to provide your own custom HTML Template for the Feature Info output.

The example below shows how it is possible to create a nice HTML output with an image taking the src from the attribute NAME values, through the use of the keyword ${properties.NAME}
Fig. 211: Fig. 5

Fig. 212: Fig. 6
Fig. 213: Fig. 7

Fig. 214: Fig. 8
Fig. 215: Fig. 9

Fig. 216: Fig. 10
Fig. 217: Fig. 11

San Andrés and Providencia

The beautiful view of San Andrés y Providencia.

Fig. 218: 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 \texttt{TINYMCE_DEFAULT_CONFIG} variable on settings.py (see \texttt{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/](https://www.tiny.cloud/).

**Search Bar**

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

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

**Sidebar Tools**

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

By default the **Sidebar** shows you the zooming buttons \text{+} and \text{−}, other options can be explored by clicking on \text{⋯} which expands/collapses the toolbar.

The **Sidebar** contains the following tools:
Fig. 220: The Search Bar

Fig. 221: Result of a Search
The **Query Objects on map** allows you to get feature information through the **button. It allows you to retrieve information about the features of some layers by clicking them directly on the map. When clicking on map a new panel opens. That panel will show you all the information about the clicked features for each active loaded layer.

- You can **Zoom To Max Extent** by clicking **.**
- You can switch between the previous and the next zoom level through the **Go Back** button ** and the **Go Forward** on **.**
- The **Switch to Full Screen** button allows to have a full screen map.
Fig. 223: *The Expanded Sidebar*

Fig. 224: *Querying Objects on map*
Basemap Switcher

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

- OpenStreetMap
- OpenTopoMap
- Sentinel-2-cloudless

You can also decide to have an Empty Background.

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. 227: The Map Scale

Fig. 228: 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. Once a Map has been published you can embed it in your web pages, your blog or your web site.

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

- Open the Map Information page and copy the URL

![Map Information Page URL](image)

- Add “/embed” to the URL so that it will be like this “http://master.demo.geonode.org/maps/11/embed”

- Use this URL inside an html iframe as src value

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

- Put this html block of code inside your web pages to display the map.

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

As you can see, some basic functionalities will be available to the user: the Table of Contents (TOC), the Basemap Switcher, the Sidebar Tools and the Options Menu Tools.
Fig. 230: The Embedded Map
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.

Fig. 231: 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. 232: 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. 233: Details of Geonode instance Dialog
Fig. 234: Successful connection Dialog

Fig. 235: Geonode instance layers Dialog
Fig. 236: 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.

![Client ID and Client Secret](image)

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: Jrchz2oPY3akmzndmgUTYrs9gc

Client secret: ***********************

Client type: Confidential

Authorization grant type: Authorization code

Redirect uris:
- http://localhost/geoserver/index.html
- http://127.0.0.1:7070/qgis-client

Algorithm: RSA with SHA-2 256

[Save button]
• 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.
### GeoNode Documentation, Release 3.2.1

#### Layers

<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 your Web Map Service</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>geonode:ACQU...</td>
<td>acque_interne_...</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>geonode:Abruz...</td>
<td>ctr_aquila</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>geonode:CP.Cs...</td>
<td>Particelle</td>
<td>Il layer contiene le particelle catastal</td>
</tr>
<tr>
<td>4</td>
<td>geonode:CP.Cs...</td>
<td>Mappe</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>5</td>
<td>geonode:RC015...</td>
<td>Praterie</td>
<td>Nam quam nunc, blandit vel, luctus</td>
</tr>
<tr>
<td>6</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>7</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>8</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>9</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>10</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>11</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>12</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>13</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>14</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>15</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>16</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>17</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>18</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>19</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>20</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>21</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>22</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>23</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>24</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>25</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</td>
</tr>
<tr>
<td>26</td>
<td>geonode:acque</td>
<td>Acque</td>
<td>Il layer contiene la rappresentazione</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 or explore existing GeoStory go to Apps menu and once in Explore Apps page on top right dropdown button Create New Apps choose GeoStory.

![Create New Apps](image1)

Fig. 237: New GeoStory Apps option

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

![GeoStory Edition Page](image2)

Fig. 238: New GeoStory Apps option

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
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 right hamburger button choose Save as…

Now your GeoStory can be shared with everyone!

Further Reading

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

GeoStory Documentation
Fig. 240: Add Media to GeoStory

Fig. 241: Save GeoStory
1.10.9 Dynamic Extra Metadata

In GeoNode 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"
}]
```

![Fig. 242: Advanced edit wizard menu](image)

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. 243: invalid JSON error

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

Fig. 244: 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:

```json
[
  {
    "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 provide 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 = [
  {
    "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
```
[
  {
    "id": 1,
(continues on next page)```
PUT:
Update specific metadata for the selected resource. In this case the metadata ID is required to perform the update.

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

Payload:

```
[{
    "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
```

DELETE:
Delete the metadata for a given resource by ID.

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

Payload: list of ID to be deleted
```
[ 1, 2, 3, 4, 5
]
```

Response:
```
status_code: 200
response: List of the available metadata
```

[ ]

1.10. GeoNode Users Guide
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:

```bash
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)

```bash
sudo add-apt-repository universe
sudo apt-get update -y
sudo apt-get install -y git-core git-buildpackage debhelper devscripts
sudo apt-get install -y apt-transport-https ca-certificates curl gnupg-agent software-properties-common

curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(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 $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:

```bash
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)**

```bash
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:

```bash
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

Alterantively 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
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
DEFAULT_BACKEND_DATASTORE=datastore
BROKER_URL=amqp://guest:guest@rabbitmq:5672/
```

(continues on next 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

-GEONODE_LB_HOST_IP=localhost

+GEONODE_LB_HOST_IP=my_geonode.geonode.org

GEONODE_LB_PORT=80

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

HTTP_PORT=80
HTTPS_PORT=443

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

# LETSENCRYPT_MODE=staging
-# LETSENCRYPT_MODE=production
+LETSENCRYPT_MODE=production

RESOLVER=127.0.0.11
# Security

## Admin Settings

```
ADMIN_PASSWORD=admin
-ADMIN_EMAIL=admin@localhost
+ADMIN_EMAIL=admin@my_geonode.geonode.org
```

## EMAIL Notifications

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

## Session/Access Control

```
LOCKDOWN_GEONODE=False
CORS_ORIGIN_ALLOW_ALL=True
SESSION_EXPIRED_CONTROL_ENABLED=True
DEFAULT_ANONYMOUS_VIEW_PERMISSION=True
```

### Restart the containers

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

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

```
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

---

1.11. GeoNode Basic Installation
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!
```

```
# 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 though both HTTP and HTTPS at the
    # same time and hence remove HTTP_HOST from this line

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

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

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

5. Reload the NGINX configuration

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

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

```
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.

```bash
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 Administration Dashboard](image)

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

Avoid using Symbols (e.g. `@#$%`) as they might conflict with `.env` file
Fig. 246: GeoServer Admin Password Update
Fig. 247: OAuth2 REST API Key Update
GeoServer Disk Quota

Fig. 248: 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/

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

--- my_geonode\.env
+++ my_geonode\.prod.env

(continues on next page)
# 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=Jrchz2oPY3akmzndmgUTYrs9gcz1goV20YPsvqaV`
- `OAUTH2_CLIENT_SECRET=rCnp5txobUo83EpQEb1M8fVj3QT5zb5qRfxNsuPzCqZaiRyIoM4jdgMiZKFfePBHYXCLd7B8N1kfDBY9HKeIQPcy5Cp08B`
- `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

# 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.

```bash
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
nginx -s reload
exit
```

```
-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;
```

1.11. GeoNode Basic Installation
Restart the GeoNode and NGINX containers

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

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

### 1.11.6 Further Production Enhancements

#### GeoServer Production Settings

##### JVM Settings: Memory And GeoServer Options

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

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

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

11. GeoNode Basic Installation 204
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)

**Fig. 249: 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. 250: Global Settings

Fig. 251: Image Processing Settings

Fig. 252: 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

Fig. 255: *WMS Resource Consumption Limits*
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.

![Image of GeoServer Tile Layers]

Fig. 256: 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:

```
# 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

```bash
nano /geoserver_data/data/geofence/geofence-datasource-ovr.properties
```

**Note:** Make sure to provide the same connection parameters specified in the `.env` file

```bash
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

```bash
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/
```

1.11. GeoNode Basic Installation
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. 258: 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 \n    python3.8-dev python3.8-venv virtualenvwrapper \n    libxml2 libxml2-dev gettext libmemcached-dev zlib1g-dev \n    libxslt1-dev libjpeg-dev libpng-dev libpq-dev \n    software-properties-common build-essential \n    git unzip gcc zlib1g-dev libgeos-dev libproj-dev \n    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, its recommended to use a python virtual environment to avoid conflicts on dependencies with system wide python packages and other installed software. See also documentation of Virtualenvwrapper package for more information

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

which python3.8  # copy the path of python executable

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

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

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

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

source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
workon geonode

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

Note: In order to save permanently the virtualenvwrapper environment

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

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

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

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

3. 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_" >> /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, 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 connection trusted for the default user.

Make sure your configuration looks like the one below.

```... # DO NOT DISABLE!
# If you change this first entry you will need to make sure that the # database superuser can access the database using some other method. # Noninteractive access to all databases is required during automatic # maintenance (custom daily cronjobs, replication, and similar tasks). # # Database administrative login by Unix domain socket
```
local all postgres trust

# TYPE DATABASE USER ADDRESS METHOD
# "local" is for Unix domain socket connections only
local all all md5
# IPv4 local connections:
host all all 127.0.0.1/32 md5
# IPv6 local connections:
host all all ::1/128 md5
# Allow replication connections from localhost, by a user with the
# replication privilege.
local replication all all peer
host replication all all 127.0.0.1/32 md5
host replication all 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 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

```bash
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:

```bash
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.

```bash
ss -ltn
```

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

```bash
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:

```bash
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
```

```ini
[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

```bash
# Create the target folders
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
```

(continues on next page)
sudo chmod -Rf 775 /opt/data/logs

# Download and extract the default GEOSERVER_DATA_DIR
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

1.12. GeoNode Advanced Installation 222
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.

```
# 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

```
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 10:06:34,320 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: 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=postgresql://geonode:geonode@localhost:5432/geonode
env = GEODATABASE_URL=postgresql://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)
env = HTTP_HOST=localhost
env = HTTPS_HOST=

env = HTTP_PORT=8000
env = HTTPS_PORT=443
```

(continues on next page)
# 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=Jrchz2oPY3akmzndmgUTYrs9gczlgoV20YPsvqaV
env = OAUTH2_CLIENT_SECRET=rCnp5txobUo83EpQEblM8fVj3QT5zb5qRfxNsUpzCqZaiRyIoXM4jdgMiZKFePBHYXCLd7B8NlkfDBY9HIKeIQPCy5Cp08

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

# Production and Monitoring
# env = DEBUG=False

env = SECRET_KEY='myv-y4#7j-d^p-__@j#*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

1.12. GeoNode Advanced Installation
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 = 1000 ; Restart workers after this many requests
max-worker-lifetime = 3600 ; Restart workers after this many seconds
reload-on-rss = 2048 ; Restart workers after this much resident memory
worker-reload-mercy = 60 ; How long to wait before forcefully killing workers

cheaper-algo = busyness
processes = 128 ; Maximum number of workers allowed
cheaper = 8 ; Minimum number of workers allowed
cheaper-initial = 16 ; Workers created at startup
cheaper-overload = 1 ; Length of a cycle in seconds
cheaper-step = 16 ; How many workers to spawn at a time

cheaper-busyness-multiplier = 30 ; How many cycles to wait before killing workers
cheaper-busyness-min = 20 ; Below this threshold, kill workers (if stable for
    --> multiplier cycles)
cheaper-busyness-max = 70 ; Above this threshold, spawn new workers
cheaper-busyness-backlog-alert = 16 ; Spawn emergency workers if more than this many
    --> requests are waiting in the queue

(continues on next page)
cheaper-busyness-backlog-step = 2  ; How many emergency workers to create if there are too many requests in the queue

# 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/systemd/system/geonode-uwsgi.service
# 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;

(continues on next page)
gzip_min_length 1100;
gzip_comp_level 6;
gzip_types video/mp4 text/plain application/javascript application/x-javascript text/javascript text/xml text/css image/jpeg;

## Virtual Host Configs

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

# Remove the Default NGINX config
sudo rm /etc/nginx/sites-enabled/default

# Create the GeoNode App NGINX config
sudo vim /etc/nginx/sites-available/geonode

uwsgi_intercept_errors on;

upstream geoserver_proxy {
  server localhost:8080;
}

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

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

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

  server_name _;
  charset utf-8;
  etag on;
  expires $expires;
  proxy_read_timeout 600s;
  # set client body size to 2M #
  client_max_body_size 50000M;
}
location / {
  etag off;
  uwsgi_pass 127.0.0.1:8000;
  uwsgi_read_timeout 600s;
  include uwsgi_params;
}

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

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

location /geoserver {
  proxy_pass http://geoserver_proxy;
  include proxy_params;
}

# 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 default 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
```

(continues on next page)
# 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

```bash
# 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

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

Reload the UWSGI configuration with

```bash
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.

   ```
   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.

   ```
   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.

   ```
   workon geonode
   sudo su
   cd /opt/geonode
   # Update the GeoNode ip or hostname
   PYTHONWARNINGS=ignore VIRTUAL_ENV=$VIRTUAL_ENV DJANGO_SETTINGS_MODULE=geonode.
   -l local_settings GEONODE_ETC=/opt/geonode/geonode GEOSERVER_DATA_DIR=/opt/data/
   -g geoserver_data TOMCAT_SERVICE="service tomcat9" APACHE_SERVICE="service nginx
   -g geonode_updateip -l localhost -p www.example.org
   exit
   ```

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

   ```
   workon geonode
   # To avoid spatialite conflict if using postgresql
   vim $VIRTUAL_ENV/bin/postactivate
   ```

(continues on next page)
# Add these to make available. Change user, password and server information to yours
export DATABASE_URL='postgresql://<postgresqluser>:<postgresqlpass>@localhost:5432/geonode'

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

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

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

    # 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. 259: Redirect URIs

Fig. 260: Proxy Base URL
From the GeoServer Admin GUI go to Security > Authentication > Authentication Filters > geonode-oauth2

5. Update the UWSGI configuration

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

# Change everywhere 'http' to 'https'
%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. 262: OAuth2 Service Parameters
uwsgi
socket = 0.0.0.0:8000
uid = geonode
gid = www-data

plugins = python
virtualenv = /home/geonode/Envs/geonode
env = DEBUG=False
env = DJANGO_SETTINGS_MODULE=geonode.local_settings
env = SECRET_KEY='RanD6m%3cr3tK3y'
env = SITE_HOST_NAME=www.example.org
env = SITEURL=https://www.example.org/
env = LOCKDOWN_GEONODE=False
env = SESSION_EXPIRED_CONTROL_ENABLED=True
env = FORCE_SCRIPT_NAME=
env = EMAIL_ENABLE=False
env = DJANGO_EMAIL_HOST_USER=
env = DJANGO_EMAIL_HOST_PASSWORD=
env = DJANGO_EMAIL_HOST=www.example.org
env = DJANGO_EMAIL_PORT=25
env = DJANGO_EMAIL_USE_TLS=False
env = DEFAULT_FROM_EMAIL=GeoNode <no-reply@www.example.org>
env = MONITORING_ENABLED=True
env = GEOSERVER_PUBLIC_HOST=www.example.org
env = GEOSERVER_PUBLIC_PORT=
env = GEOSERVER_ADMIN_PASSWORD=geoserver
env = GEOSERVER_LOCATION=https://www.example.org/geoserver/
env = GEOSERVER_PUBLIC_LOCATION=https://www.example.org/geoserver/
env = GEOSERVER_WEB_UI_LOCATION=https://www.example.org/geoserver/
env = RESOURCE_PUBLISHING=False
env = ADMIN_MODERATE_UPLOAIDES=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

Fig. 263: UWSGI Configuration
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/supervisord.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]
supervisor.rpcinterface_factory = supervisor.rpcinterface:make_main_rpcinterface

[supervisorct1]
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):

```bash
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:

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

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

- ASYNC_SIGNALS="True"
- BROKER_URL="amqp://admin:<your_rabbitmq_admin_password_here>@localhost:5672/"
- 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**

```bash
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

```bash
#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
#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)
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

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

2. Create necessary users

```bash
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:

```bash
sudo visudo
```

Add these lines in the editors

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

Save to /etc/sudoers from temporary file and exit.
4. Configure PostgreSQL 13

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

```
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 postgresql13-devel
sudo /usr/bin/postgresql-13/setup initdb
sudo systemctl enable --now postgresql-13
sudo systemctl start postgresql-13

cat <EOF>> /var/lib/pgsql/13/data/pg_hba.conf
# DO NOT DISABLE!
# If you change this first entry you will need to make sure that the
# database superuser can access the database using some other method.
# Noninteractive access to all databases is required during automatic
# maintenance (custom daily cronjobs, replication, and similar tasks).
# # Database administrative login by Unix domain socket
local  all         postgres      trust

# TYPE    DATABASE  USER            ADDRESS                  METHOD
# "local" is for Unix domain socket connections only
local  all         all      trust
# IPv4 local connections:
host  all         all      127.0.0.1/32      md5
# IPv6 local connections:
host  all         all      ::1/128         md5
# Allow replication connections from localhost, by a user with the
# replication privilege.
local replication all     peer
host  replication all     127.0.0.1/32      md5
host  replication all     ::1/128         md5
EOF

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

247


9. Configure /etc/uwsgi.d/geonode.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 = GEOSERVER_WEB_UI_LOCATION=https://<your_public_geonode_hostname>/geoserver/
env = OGC_REQUEST_TIMEOUT=60
env = OGC_REQUEST_MAX_RETRIES=3
env = OGC_REQUEST_POOL_MAXSIZE=100
env = OGC_REQUEST_POOL_CONNECTIONS=100
env = SECURE_SSL_REDIRECT=True
env = SECURE_HSTS_INCLUDE_SUBDOMAINS=True
env = AVATAR_GRAVATAR_SSL=True
env = OAUTH2_API_KEY=<secret_here>
env = OAUTH2_CLIENT_ID=<secret_here>
env = OAUTH2_CLIENT_SECRET=<secret_here>

# pidfile = /tmp/geonode.pid
chdir = /opt/geonode
module = geonode.wsgi:application
strict = false
master = true
enable-threads = true ; Delete sockets during shutdown
vacuum = true
single-interpreter = true ; Shutdown when receiving SIGTERM (default is _.respawn)
die-on-term = true
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
                   multiplier cycles
cheaper-busyness-max = 70 ; Above this threshold, spawn new workers
cheaper-busyness-backlog-alert = 16 ; Spawn emergency workers if more than this many
                   requests are waiting in the queue
cheaper-busyness-backlog-step = 2 ; How many emergency workers to create if there are
                   too many requests in the queue

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

10. Modify /etc/nginx/nginx.conf

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

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

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

events {
    worker_connections 1024;
}

http {
    log_format main '{remote_addr} - {remote_user} [{time_local}]"$request" '
        '{status} {body_bytes_sent} "{http_referer}" '
        '"{http_user_agent}" "{http_x_forwarded_for}"';

    access_log /var/log/nginx/access.log main;

    sendfile on;
tcp_nopush on;
tcp_nodelay on;

(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
GeoNode Documentation, Release 3.2.1

application/json;

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

# GeoNode
location /static/ {
    alias /opt/geonode/geonode/static_root/;

    location ~* \.(html|js|jpg|jpeg|gif|png|css|tgz|gz|rar|bz2|doc|pdf|ppt|tar|wav|bmp|ttf|rtf|swf|ico|flv|txt|woff|woff2|svg|xml) {
        gzip_static always;
        expires 30d;
        access_log off;
        add_header Pragma "public";
        add_header Cache-Control "max-age=31536000, public";
    }
}

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

    location ~* \.(html|js|jpg|jpeg|gif|png|css|tgz|gz|rar|bz2|doc|pdf|ppt|tar|wav|bmp|ttf|rtf|swf|ico|flv|txt|woff|woff2|svg|xml) {
        gzip_static always;
        expires 30d;
        access_log off;
        add_header Pragma "public";
    }
}

location / {
    set $upstream 127.0.0.1:8000;
    include /etc/nginx/uwsgi_params;

    if ($request_method = OPTIONS) {
        add_header Access-Control-Allow-Methods "GET, POST, PUT, PATCH, OPTIONS";
        add_header Access-Control-Allow-Headers "Authorization, Content-Type, Accept";
        add_header Access-Control-Allow-Credentials true;
        add_header Content-Length 0;
        add_header Content-Type text/plain;
        add_header Access-Control-Max-Age 1728000;
        return 200;
    }

    add_header Access-Control-Allow-Credentials false;
    add_header Access-Control-Allow-Headers "Content-Type, Accept, Authorization, Origin, User-Agent";
    add_header Access-Control-Allow-Methods "GET, POST, PUT, PATCH, OPTIONS";
}

(continued on next page)
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
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 "$0" _/home/geonode/.virtualenvs/geonode/bin/uwsgi /etc/uwsgi.ini
Restart=on-failure
[Install]
WantedBy=multi-user.target
13. Enable uwSGI service

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

14. Configure Postgres Database in GeoNode

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

15. Configure local_settings.py

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

16. Initialize GeoNode

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

```
sudo cp package/support/geonode.binary /usr/bin/geonode
sudo cp package/support/geonode.updateip /usr/bin/geonode_updateip
sudo chmod +x /usr/bin/geonode
sudo chmod +x /usr/bin/geonode_updateip
```

```
sudo PYTHONWARNINGS=ignore VIRTUAL_ENV=$VIRTUAL_ENV DJANGO_SETTINGS_MODULE=geonode.local_ ...
  settings GEONODE_ETC=/opt/geonode/geonode GEOSERVER_DATA_DIR=/opt/data/geoserver_data T...
  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 ...
  --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. 265: Proxy Base URL

Fig. 266: Role Base URL
Authentication using a GeoNode OAuth2 geonode-oauth2

Authenticates by looking up for a valid GeoNode OAuth2 access_token key sent as URL parameter

Name:
geonode-oauth2

OAuth2 provider connection

Enable Redirect Authentication EntryPoint
Login Authentication EndPoint
/l_spring_oauth2_geonode_login
Logout Authentication EndPoint
/l_spring_oauth2_geonode_logout

Force Access Token URI HTTPS Secured Protocol
Access Token URI
https://www.example.org/oauth/token/

Force User Authorization URI HTTPS Secured Protocol
User Authorization URI
https://www.example.org/oauth/authorize/

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

Check Token Endpoint URI
https://www.example.org/api/o/v1/tokeninfo/

Logout URI
https://www.example.org/account/logout/

Scopes

write

Client ID
6As43yilpsNO9tcwXXM7XP pense1EFSFSpY2mcDf

Client Secret
RhHyG7tc1DO597MkLQmKXcTogubaHLQ7kspB9uEJ

Role source

Role service
geonode REST role service

Fig. 267: 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 virtualenv 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.


   **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
```

(continues on next page)
3. Installation of required libraries and run locally

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

1. Edit requirement.txt file

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

   It will open the requirement.txt file in notepad. Change Shapely==1.7.0 to Shapely==1.6.3. Since we not gonna deploy geonode in windows, remove the production packages from requirement.txt file,
   # production uWSGI==2.0.18 gunicorn==20.0.4 ipython==7.14.0 docker==4.2.0 invoke==1.4.1

2. Install the requirement.txt file

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

   # 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

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

   Now the geonode will run on your windows.

4. Postgresql Database setup

   In this section we are going to install setup PostgreSQL database on GeoNode. GeoNode uses the PostgreSQL 11 database.
   1. Download and install the postgres 11 windows installer
   2. After installation of PostgreSQL 11, open stack builder and install the spatial extension named as postgis

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

   3. Now it is time create database and add user
**Warning:** Make sure you added postgresql to environment variable path. Otherwise psql will not be recognize in command prompt. Also you can search psql in windows and run the code directly from psql shell.

```bash
# 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

```plaintext
# "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.

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

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

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

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

1. Install Docker and docker-compose packages on a Ubuntu host
2. Deploy a vanilla GeoNode 3.2.0 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
dsud apt-get install -y apt-transport-https ca-certificates curl gnupg-agent software-properties-common

curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable"
sudo apt-get update -y
sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose

sudo apt-get purge --autoremove

sudo usermod -aG docker geonode
```

su geonode

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

Docker Setup (First time only)

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

sudo yum install -y yum-utils device-mapper-persistent-data lvm2

sudo yum-config-manager --add-repo https://download.docker.com/linux/centos/docker-ce.repo

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

(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

# 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.

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:

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.

---

1.12. GeoNode Advanced Installation 262
Override the ENV variables to deploy on a public IP or domain

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

```
cd /opt/geonode

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

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

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

Replace everywhere localhost with www.example.org

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

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

```yaml
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

cd /usr/local/tomcat/
wget --no-check-certificate "https://artifacts.geonode.org/geoserver/2.19.x/geoserver.war" -O geoserver-2.19.x.war
mkdir tmp/geoserver

cd tmp/geoserver/
unzip /usr/local/tomcat/geoserver-2.19.x.war
rm -Rf data
cp -Rf /usr/local/tomcat/webapps/geoserver/data/ .
cd /usr/local/tomcat/
mv webapps/geoserver/ .
mv tmp/geoserver/ webapps/
exit
```
**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.

```
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)

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

```bash
CONTAINER ID       IMAGE                         COMMAND                  CREATED          STATUS                         PORTS                  NAMES
3b232931f820       geonode/nginx:production    "nginx -g 'daemon of..." 26 minutes ago Up 26 minutes 0.0.0.0:80->80/tcp nginx4geonode
ff7002ae6e91        geonode/geonode:latest      "/usr/src/app/entryp..." 26 minutes ago Up 26 minutes 8000/tcp django4geonode
2f155e5043be        geonode/geoserver:2.18.3  "/usr/local/tomcat/t..." 26 minutes ago Up 26 minutes 8080/tcp geoserver4geonode
97f1668a01b1        geonode_celery            "/usr/src/app/entryp..." 26 minutes ago Up 26 minutes 8000/tcp geonode_celery_1
1b623598b1bd        geonode/postgis:10       "/docker-entrypoint.s..." About an hour ago Up 26 minutes 5432/tcp db4geonode
```

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

```
```
GeoNode Documentation, Release 3.2.1

# 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.

1.12. GeoNode Advanced Installation

267


Ubuntu 18.04

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

Install the dependencies

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

Upgrade system packages

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

```
sudo apt update
```

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.

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

Alterantively 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,html,env,ini,env,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
```

# 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\_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, 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

```
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

```
sudo -u postgres createdb -O my_geonode my_geonode
sudo -u postgres createdb -O my_geonode my_geonode_data
```

Next let’s create PostGIS extensions

```
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;"
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 public TO my_geonode_data;"
```

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 connection trusted for the default user. Make sure your configuration looks like the one below.

```
...  
# DO NOT DISABLE!
# If you change this first entry you will need to make sure that the
# database superuser can access the database using some other method.
# Noninteractive access to all databases is required during automatic
# maintenance (custom daily cronjobs, replication, and similar tasks).
#  
# Database administrative login by Unix domain socket
local all postgres trust
# TYPE DATABASE USER ADDRESS METHOD
```

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

./paver_dev.sh reset_hard

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

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

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

http://localhost:8000/

Sign-in with:

user: admin
password: admin

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

```
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.

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

Alternately 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,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

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

Finally, run the containers

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

Deploy an instance of a geonode-project Django template 3.2.0 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

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

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

```
vim .env
```

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

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

Run the containers in daemon mode

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

**Test geonode-project with vagrant**

```
apt-get install -y vagrant
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

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:

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

Actstream Settings.

ADMIN_MODERATE_UPLODS

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_GEONODE is not True. For example, AUTH_EXEMPT_URLS = ('/maps',) will allow unauthenticated users to browse maps.
**AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_NAME**

Default: True
Env: AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_NAME

Auto assign users to a default REGISTERED_MEMBERS_GROUP_NAME private group after AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_AT.

**AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_AT**

Default: activation
Env: AUTO_ASSIGN_REGISTERED_MEMBERS_TO_REGISTERED_MEMBERS_GROUP_AT
Options: "registration" | "activation" | "login"

Auto assign users to a default REGISTERED_MEMBERS_GROUP_NAME private group after {"registration" | "activation" | "login"}.

Notice that whenever ACCOUNT_EMAIL_VERIFICATION == True and ACCOUNT_APPROVAL_REQUIRED == False, users will be able to register and they became active already, even if they won’t be able to login until the email has been verified.

**AUTO_GENERATE_AVATAR_SIZES**

Default: 20, 30, 32, 40, 50, 65, 70, 80, 100, 140, 200, 240

An iterable of integers representing the sizes of avatars to generate on upload. This can save rendering time later on if you pre-generate the resized versions.

**AVATAR_GRAVATAR_SSL**

Default: False
Env: AVATAR_GRAVATAR_SSL
Options: True | False

Force SSL when loading fallback image from gravatar.com.

**AVATAR_DEFAULT_URL**

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

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

Default:

```
'avatar.providers.PrimaryAvatarProvider', 'avatar.providers.
GravatarAvatarProvider', 'avatar.providers.DefaultAvatarProvider'
```

Env: AVATAR_PROVIDERS
Options: Avatar provider object

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

```
'avatar.providers.PrimaryAvatarProvider', 'avatar.providers.
DefaultAvatarProvider', 'avatar.providers.GravatarAvatarProvider'
```

(DefaultAvatarProvider before GravatarAvatarProvider)

B

BING_API_KEY

Default: None

Env: BING_API_KEY

This property allows to enable a Bing Aerial background.

If using mapstore client library, make sure the MAPSTORE_BASELAYERS include the following:

```
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 Manifest 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
- USER-NAME: 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_SENT_EVENT

Default: True
If enabled, a task-sent event will be sent for every task so tasks can be tracked before they are consumed by a worker. This is a Celery setting.

CELERY_TASK_ALWAYS_EAGER

Default: False if ASYNC_SIGNALS else True
This is a Celery setting.

CELERY_TASK_CREATE_MISSING_QUEUES

Default: True
This is a Celery setting.

CELERY_TASK_IGNORE_RESULT

Default: True
This is a Celery setting.

CELERY_TASK_QUEUES

Default:

```
Queue('default', GEONODE_EXCHANGE, routing_key='default'),
Queue('geonode', GEONODE_EXCHANGE, routing_key='geonode'),
Queue('update', GEONODE_EXCHANGE, routing_key='update'),
Queue('cleanup', GEONODE_EXCHANGE, routing_key='cleanup'),
Queue('email', GEONODE_EXCHANGE, routing_key='email'),
```

A tuple with registered Queues.
**CELERY_TASK_RESULT_EXPIRES**

Default: 43200  
Env: CELERY_TASK_RESULT_EXPIRES  
This is a Celery setting.

**CELERY_TASK_SERIALIZER**

Default: json  
Env: CELERY_TASK_SERIALIZER  
This is a Celery setting.

**CELERY_TIMEZONE**

Default: UTC  
Env: TIME_ZONE  
This is a Celery setting.

**CELERY_TRACK_STARTED**

Default: True  
This is a Celery setting.

**CELERY_WORKER_DISABLE_RATE_LIMITS**

Default: False  
Disable the worker rate limits (number of tasks that can be run in a given time frame).

**CELERY_WORKER_SEND_TASK_EVENTS**

Default: False  
Send events so the worker can be monitored by other tools.

**CLIENT_RESULTS_LIMIT**

Default: 5  
Env: CLIENT_RESULTS_LIMIT  
The Number of results per page listed in the GeoNode search pages. Different from API_LIMIT_PER_PAGE, affecting the number of items returned by the APIs.
CREATE_LAYER

Default: False
Env: CREATE_LAYER

Enable the create layer plugin.

CKAN_ORIGINS

Default:

```python
CKAN_ORIGINS = [{
    "label": "Humanitarian Data Exchange (HDX)",
    "url": "https://data.hdx.rwlabs.org/dataset/new?title={name}&notes={abstract}",
    "css_class": "hdx"
}]
```

A list of dictionaries that are used to generate the links to CKAN instances displayed in the Share tab. For each origin, the name and abstract format parameters are replaced by the actual values of the 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

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:

```
[
    {
      "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_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.

**DISPLAYORIGINALDATASET_LINK**

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

**DOWNLOAD_FORMATS_METADATA**

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

```
DOWNLOAD_FORMATS_METADATA = [  
    'Atom', 'DIF', 'Dublin Core', 'ebRIM', 'FGDC', 'ISO',  
]  
```
DOWNLOAD_FORMATS_VECTOR

Specifies which formats for vector data are available for users to download.

Default:

```
DOWNLOAD_FORMATS_VECTOR = [
    'JPEG', 'PDF', 'PNG', 'Zipped Shapefile', 'GML 2.0', 'GML 3.1.1', 'CSV',
    'Excel', 'GeoJSON', 'KML', 'View in Google Earth', 'Tiles',
]
```

DOWNLOAD_FORMATS_RASTER

Specifies which formats for raster data are available for users to download.

Default:

```
DOWNLOAD_FORMATS_RASTER = [
    'JPEG', 'PDF', 'PNG', 'Tiles',
]
```

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
EPSG_CODEMATCHES

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.

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
    },
    {
``` (continues on next page)
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",
    "apiKey": "{{apiKey}}",
    "visibility": True
  }, {
    "type": "tileprovider",
    "title": "OpenTopoMap",
    "provider": "OpenTopoMap",
    "name": "OpenTopoMap",
    "source": "OpenTopoMap",
    "group": "background",
    "visibility": False
  }
]
```
GeoNode Documentation, Release 3.2.1

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:

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:

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:

```
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:

```
( (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',
    },
}
```

(continues on next page)
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',
          'NAME': 'development.db',
      },
      'geonode_imports': {
          'ENGINE': 'django.contrib.gis.db.backends.postgis',
          'NAME': 'geonode_imports',
          'USER': 'geonode_user',
          'PASSWORD': 'a_password',
          'HOST': 'localhost',
          'PORT': '5432',
      }
  }
  ```

- GEONODE_SECURITY_ENABLED
  Default: True
  A boolean that represents whether GeoNode's security application is enabled.

- LOCATION
**Default**: "http://localhost:8080/geoserver/"

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

- **MAPFISH_PRINT_ENABLED**
  
  Default: True

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

- **PASSWORD**

  Default: 'geoserver'

  The administrative password for the OGC server as a string.

- **PRINT_NG_ENABLED**

  Default: True

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

- **PUBLIC_LOCATION**

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

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

- **USER**

  Default: 'admin'

  The administrative username for the OGC server as a string.

- **WMST_ENABLED**

  Default: False

  Not implemented.

- **WPS_ENABLED**

  Default: False

  Not implemented.

- **TIMEOUT**

  Default: 10

  The maximum time, in seconds, to wait for the server to respond.
OGP_URL

Default: http://geodata.tufts.edu/solr/select
Env: OGP_URL
Endpoint of geodata.tufts.edu getCapabilities.

OPENGRAPH_ENABLED

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

PINAX_NOTIFICATIONS_BACKENDS

Default: ("email", _EMAIL_BACKEND, 0),
Used notification backend. This is a pinax notification setting:

PINAX_NOTIFICATIONS_LOCK_WAIT_TIMEOUT

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

PINAX_NOTIFICATIONS_QUEUE_ALL

Default: -1
Env: NOTIFICATIONS_LOCK_WAIT_TIMEOUT
By default, calling notification.send will send the notification immediately, however, if you set this setting to True, then the default behavior of the send method will be to queue messages in the database for sending via the emit_notices command. This is a pinax notification setting:

PINAX_RATINGS_CATEGORY_CHOICES

Default:

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

}(continues on next page)```
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 mode 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 mode 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:

```python
{'TEXT_ENABLED': True,
 'TYPE_ENABLED': True,
 'CATEGORIES_ENABLED': True,
 'OWNERS_ENABLED': True,
 'KEYWORDS_ENABLED': True,
 'H_KEYWORDS_ENABLED': True,
 'T_KEYWORDS_ENABLED': True,
 'DATE_ENABLED': True,
 'REGION_ENABLED': True,
 'EXTENT_ENABLED': True,
}
```

Enabled Search Filters for filtering resources.

SECURE_BROWSER_XSS_FILTER

Default: True

Env: SECURE_BROWSER_XSS_FILTER

If True, the SecurityMiddleware sets the X-XSS-Protection: 1; mode=block header on all responses that do not already have it. This is `Djangosettings.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 it’s 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' = {
    "<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:

```python
{
    'linkedin_oauth2': {
        'SCOPE': [
            'r_emailaddress',
            'r_basicprofile',
        ],
        'PROFILE_FIELDS': [
            'emailAddress',
            'firstName',
            'headline',
            'id',
            'industry',
        ],
    }
}
```
(continues on next page)
'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_SIGNUP

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.

**TASTYPIE_DEFAULT_FORMATS**

Default: json

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

**THEME_ACCOUNT_CONTACT_EMAIL**

Default: 'admin@example.com'

This email address is added to the bottom of the password reset page in case users have trouble unlocking their account.

**THESAURI**

Default = []

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

**TOPICCATEGORY_MANDATORY**

Default: False
Env: TOPICCATEGORY_MANDATORY

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

**TWITTER_CARD**

Default:: True

A boolean that specifies whether Twitter cards are enabled.
**TWITTER_SITE**

Default: '@GeoNode'

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

**TWITTER_HASHTAGS**

Default: ['geonode']

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

**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_beforeUnload": "true",
    "autosave_interval": "30s",
    "autosave_prefix": "\{path\}{query}\{id\}",
    "autosave_restore_when_empty": "false",
    "autosave_retention": "2m",
    "image_advtab": "true",
    "content_css": '//www.tiny.cloud/css/codepen.min.css',
    "importcss_append": "true",
    "image_caption": "true",
    "quickbars_selection_toolbar": 'bold italic | quicklink h2 h3 blockquote",
    "quickimage quicktable",
    "noneditable_noneditable_class": "mceNonEditable",
    "toolbar_mode": 'sliding',
    "contextmenu": 'link image imagetools table",
    "templates": [
        {
            "title": 'New Table',
            "description": 'creates a new table',
            "content": '<div class="mceTmpl"><table width="98%" border="0" cellspacing="0" cellpadding="0"><tr><th scope="col"></tr><th scope="col"></th><tr><th scope="col"></th><tr><td></tr><td></td><tr><td></td><tr><td></td></table></div>',
        }
    ]
}
```

(continues on next page)
HTML WYSIWYG Editor (TINYMCE) Menu Bar Settings. For more info see:

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

UI

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**

It is possible to define an own uuid handler 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
```

**X**

**X_FRAME_OPTIONS**

Default: '

`ALLOW-FROM %s % SITEURL`

This is a Django setting
1.14 Customize the Look and Feel

1.14.1 GeoNode Themes

We have already explained in *Simple Theming* how to change the GeoNode theme directly from the *Admin Interface*. This is an easy way for customizing GeoNode appearance but, in some cases, you might want to have more control on it. In those cases, you have to venture into the code and it is highly recommended to use a GeoNode Project and customize it instead of the GeoNode default HTML/CSS code. See the following sections to learn more about that.

1.14.2 Theming your GeoNode Project

There are a range of options available to you if you want to change the default look and feel of your *GeoNode Project*.

**Logos and graphics**

GeoNode intentionally does not include a large number of graphics files in its interface. This keeps page loading time to a minimum and makes for a more responsive interface. That said, you are free to customize your GeoNode’s interface by simply changing the default logo, or by adding your own images and graphics to deliver a GeoNode experience the way you envision it.

Your GeoNode project has a directory already set up for storing your own images at `<my_geonode>/static/img`. You should place any image files that you intend to use for your project in this directory.

Let’s walk through an example of the steps necessary to change the default logo.

1. Change to the *img* directory:

   ```
   $ cd <my_geonode>/static/img
   ```

2. If you haven’t already, obtain your logo image. The URL below is just an example, so you will need to change this URL to match the location of your file or copy it to this location:

   ```
   $ 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:

   ```
   $ 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>
   (continues on next page)
   ```
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](example.png)

Fig. 268: 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:

```css
#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
```
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.

![Screenshot of using browser debugger to inspect the CSS overrides](image)

---

**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:

   ```bash
   cd <my_geonode>/templates/geonode-mapstore-client/snippets
   sudo vi custom_theme.html
   ```

1. Add the following content to this page:
1. Restart httpd server

```
$ 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

Login as administrator on GeoNode and go to Admin page:

Create a new theme under GeoNode Themes Library and Themes:
1.14. Customize the Look and Feel
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.

After this, reload your GeoNode homepage. The output should be similar to this:

![GeoNode homepage with customizations](image)
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. 271: Change Dataset Permissions

The page for setting the permissions, allows addition of users/groups and selection of a permission to assign each of them.
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 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.
- 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.
1.15. GeoNode permissions

Fig. 273: Geo Limits Icon

Fig. 274: Geo Limits: Preview Window with Drawing Tools
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. 276: Geo Limits: Geospatial restrictions applies for the user

Fig. 277: Configuration change in the admin panel
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;

1.17. Harvesting resources from remote services
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.

  - Harvester 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

---

1.17. Harvesting resources from remote 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:

```
{
  "harvester": {harvester-id},
  "status": "perform_harvesting"
}
```
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 many 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:

   ```
   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:

   ```
   ```

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 it’s own metrics set. Metric value may be either value counter (like country of user), numeric counter (like number of requests) or rate (like bytes in/out on network interface).

Besides metric data, monitoring will also store exception information for exceptions that were captured during request handling.
Data are collected periodically (at most every 1 minute), aggregated and stored in aggregated form. User can see data
from predefined relative periods (last minute, last 10 minutes, last hour, last day, last week).
User can enable and configure automated checks, which will be run after each collection/aggregation cycle, and will emit
notifications if metric values in that run exceed configured thresholds.

Analytics

GeoNode monitoring application makes also available information about resources usage at user level.

Those information are collected whenever an event occurs about some resource. Events can be of different types
(EventType) which refer to common user activities on resources (upload, view, download, etc.). Those data are stored
using a dedicated metric and aggregated based on a configurable granularity, depending on the time interval consid-
ered 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/manager.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
```
```
sudo service supervisor restart
sudo supervisorctl start geonode-monitoring
sudo supervisorctl status geonode-monitoring

sudo vim /etc/hosts

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

# The following lines are desirable for IPv6 capable hosts
```

**Configuration**

In order to have working monitoring, at least Service should be configured. Let’s assume following deployment scenario:

- there’s one machine, geo01
- geo01 hosts both GeoNode and GeoServer (including PostgreSQL).
- applications are served with nginx+uwsgi, on port 80, but they are reachable on localhost address.
- GeoServer is served from /geoserver/ path
- GeoNode is served from / path

Here’s step-by-step instruction how to create monitoring setup for deployment scenario:

1. Log in as admin, and go to admin section:

   ![GeoNode Welcome Page]

2. Go to monitoring section (or type /admin/monitoring/ as a path in URL):
3. Go to **Hosts:**

<table>
<thead>
<tr>
<th>Layers</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Layers</td>
<td></td>
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<tr>
<td>Styles</td>
<td></td>
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</tr>
<tr>
<td>Upload sessions</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Maps</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Map layers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Map snapshots</td>
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<tr>
<td>Maps</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Add</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exception events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hosts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric labels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric notification checks</td>
<td>Add</td>
<td>Change</td>
</tr>
<tr>
<td>Metrics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitored resources</td>
<td>Add</td>
<td>Change</td>
</tr>
</tbody>
</table>
4. Click on Add host +:

5. Enter following information: * host: localhost * ip: 127.0.0.1 Note, that host value is arbitrary. You can enter other name if you like. Don’t forget to save.

6. Go to Services:
7. Click on **Add service +**:

8. Enter following information:
   - **name**: local-geonode
   - **host**: localhost
   - **service type**: geonode
9. Add another Service Enter following information:

- **name**: local-system-geonode
- **host**: localhost
- **service type**: hostgeonode
- **url**: http://localhost/ (should point to GeoNode home page)
10. Add another Service and enter following information:

- **name**: `local-geoserver`
- **host**: `localhost`
- **service type**: `geoserver`
- **url**: `http://localhost/geoserver/` (should point to GeoServer home page)
To summarize, following entries should be created in admin/monitoring:

- **Host**: localhost, with ip: 127.0.0.1
- **Service**: local-geonode:
  - host localhost
  - type geonode
- **Service**: local-geoserver:
  - url http://localhost/geoserver/
  - host localhost
  - type geoserver
- **Service**: local-system-geonode
  - url http://localhost/
  - host localhost
  - type hostgeonode
Usage

Monitoring interface is available for superusers only. It’s available in profile menu:

Dashboard

Main view offers overview of recent situation in GeoNode deployment.
Top bar and indicators

With top bar buttons User can:

- go back from nested interface elements (charts, alerts, errors)
- select time window from which data will be aggregated and shown (last 10 minutes, last 1 hour, last day or last week from now)
- see what's currently used time window
- enable/disable autorefresh

Below there are four main health indicators:

- **aggregated Health Check information.** This element will be:
  - *green* if there is no alerts nor errors
  - *yellow* if there are alerts
  - *red* if there are errors

- **Uptime** that shows GeoNode’s system uptime.

- **Alerts** shows number of notifications from defined checks. When clicked, Alerts box will show detailed information. See Notifications description for details.

- **Errors** - shows how many errors were captured during request processing. When clicked, Errors box will show detailed list of captured errors. See Errors description for details.

Indicators in error state

**Software Performance**

Software Performance view shows GeoServer web service statistics, for all requests monitored and detailed, OWS-specific, per service type (WMS, WFS, OCS etc).
Clicking on will show charts with data history for overall performance and per-OWS performance:
Hartware Performance

Hardware performance box shows hardware usage statistics for selected host (monitored with any of hostgeonode or hostgeoserver type Service): % of CPU usage and average memory consumption. User can select from which host data will be presented.
Clicking on

**Hardware Performance**

lost

calhost

will show charts with data history for selected host and time period
Errors

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/

```

```

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/

```

```

(continues on next page)
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 sting arguments:

- `metric_name` - name of metric for which resources should be returned
- `resource_type` - name of type of resource (`layer`, `map`, `document`, `style`, `url`)
- `valid_from` - list resources that are available since that timestamp
- `valid_to` - list resources that are available until that timestamp

Example:

```
GET /monitoring/api/resources/?resource_type=layer&metric_name=request.count&valid_from=2017-08-01
```

```
{
    "resources": [
    {
        "type": "layer",
        "id": 24,
        "name": "atlantis:landmarks"
    },
    {
        "type": "layer",
        "id": 2,
        "name": "topp:states"
    },
    {
        "type": "layer",
        "id": 22,
        "name": "atlantis:island"
    },
    {
        "type": "layer",
        "id": 23,
        "name": "http://www.opengis.net/gml:GridCoverage"
    }
    ]
}
```
{ "name": "atlantis:poi"
},
{ "type": "layer",
 "id": 16,
 "name": "dissolveroad2"
},
{ "type": "layer",
 "id": 21,
 "name": "atlantis:roads"
}

Resource type

Resource Types describe which types of resource the GeoNode monitoring consider. To retrieve the full list of Resource Types the /api/resource_types/ is available:

GET /monitoring/api/resource_types/

{ "status": "ok",
 "data": { "key": "resource_types"
 },
 "errors": {},
 "resource_types": [
 { "type": "No resource",
 "name": ""
 },
 { "type": "Layer",
 "name": "layer"
 },
 { "type": "Map",
 "name": "map"
 },
 { "type": "Resource base",
 "name": "resource_base"
 },
 { "type": "Document",
 "name": "document"
 },
 { "type": "Style",
 "name": "style"
 ]
}
GeoNode Documentation, Release 3.2.1

Event Types

Event Types describe the way resources were used in GeoNode. Resource can be accessed as a regular view (through GeoNode, like /layers/X url), or through OWS request. Full list of Event Types handled is available in /api/event_types/ endpoint:

GET /monitoring/api/event_types/

{
   "status": "ok",
   "errors": { },
   "data": {
      "key": "event_types"
   },
   "event_types": [
      { "name": "all"
      },
      { "name": "other"
      },
      { "name": "download"
      },
      { "name": "view"
      },
      { "name": "OWS:TMS"
      },
      { "name": "OWS:WMS-C"
      }
   ]
}
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
• non-OWS event types

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

```json
{
    "status": "ok",
    "errors": {},
    "data": {
        "key": "event_types"
    },
    "event_types": [
        {
            "name": "OWS:TMS",
            "type_label": "TMS"
        },
        {
            "name": "OWS:WMS-C",
            "type_label": "WMS-C"
        },
        {
            "name": "OWS:WMTS",
            "type_label": "WMTS"
        },
        {
            "name": "OWS:WCS",
            "type_label": "WCS"
        },
        {
            "name": "OWS:WFS",
            "type_label": "WFS"
        },
        {
            "name": "OWS:WMS",
            "type_label": "WMS"
        },
        {
            "name": "OWS:WPS",
            "type_label": "WPS"
        },
        {
            "name": "OWS:ALL",
            "type_label": "Any OWS"
        }
    ],
    "success": true
}
```
"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 sting 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

```
{
  "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-namespaced description of what kind of data metric stores. Typical metric names: - request.count - request.ip - response.size - response.status

Each service type has a set of metrics available. Application-level services will have different metric set than host-level services.

Full list of metrics is available in /api/metrics/ endpoint. Returned list is not filterable. Sample response:

GET /monitoring/api/metrics/

```
{
  "metrics": [
  {
    "metrics": [
    {
      "type": "count",
      "name": "request.count",
      "unit": "Count"
    },
    ...
    ]
  }
}
```
Metrics are grouped by service. Each metric has following structure:

```json
{
  "type": "count",
  "name": "request.ip",
  "unit": "Count"
}
```

where:

- `type` is a metric data type (it can be count, value or rate). This is internal description of how to deal with aggregation of data for metric.
- `name` name of metric
- `unit` suggested Y-axis label, describing data units

## Metric Data

Core feature of monitoring API is ability to get data for given metric for specified period. Metric value is a data set for fixed period of time, from which data were collected and processed for one specific metric name. Additionally, each metric can have data calculated for specific services, resources, labels and event_types. Metric data API has several features:

- It can show metric data within specific time frame, down to 1 minute granularity (may be less if collection intervals are lower).
- It can show metric data aggregated with custom granularity (for example from last 48 hours with 15 minutes granularity).
- It can show metric data for whole monitored setup or for specific resource, label (like user agent type), monitored service (just for geonode or just for geoserver), Event type. Params can be joined in one query.

API endpoint is: `/api/metric_data/METRIC_NAME/`

Sample request for `request.ua` metric in specific time window (between 10am and 2pm of 2017-08-03) and data granularity (1h)

```
GET /monitoring/api/metric_data/request.ua/?
valid_from=2017-08-03%2010:00:00&valid_to=2017-08-03%2014:00:00&interval=3600
```
{
  "data": {
    "input_valid_from": "2017-08-03T10:00:00",
    "input_valid_to": "2017-08-03T14:00:00",
    "data": [
      {
        "valid_from": "2017-08-03T10:00:00",
        "valid_to": "2017-08-03T11:00:00"
      },
      {
        "valid_from": "2017-08-03T11:00:00",
        "data": [
          {
            "samples_count": 10,
            "val": "10.0000",
            "min": "1.0000",
            "max": "1.0000",
            "sum": "10.0000",
            "label": "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:53.0) Gecko/20100101 Firefox/53.0",
            "metric_count": 10
          },
          {
            "samples_count": 790,
            "val": "790.0000",
            "min": "19.0000",
            "max": "79.0000",
            "sum": "790.0000",
            "label": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.78 Safari/537.36",
            "metric_count": 22
          },
          {
            "samples_count": 150,
            "val": "150.0000",
            "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",
        "valid_to": "2017-08-03T13:00:00"
      },
      {
        "valid_from": "2017-08-03T13:00:00",
        "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": [
    ... # actual data
  ]
}
```

where:

- `input_valid_from` and `input_valid_to` are parsed and aligned timestamps for which data are returned,
- `metric` is metric name for which response is returned,
- `interval` data aggregation interval used, in seconds (if none is provided, 60 seconds are used, unless time window is larger than 24 hours),
- `type` is metric data type, which describes internally how data are aggregated (sum, average or min/max function),
- `axis_label` is suggested value-axis label to be used in chart
- `label` is metric data label used (no label by default).

Metric data item is build as following structure:

```
"data": [
  {
    "samples_count": 37,
    "val": "37.0000",
    "min": "4.0000",
    "max": "12.0000",
    "sum": "37.0000",
    "label": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.40 Safari/537.36",
    "metric_count": 4
  },
  "valid_to": "2017-08-03T14:00:00"
]
```

```
where:

- `samples_count` is the number of samples for which data were collected,
- `val` is the value of metric, calculated as the sum of all metric values for samples,
- `min` is the minimum value of metric for collected samples,
- `max` is the maximum value of metric for collected samples,
- `sum` is the sum of all metric values for samples,
- `label` is the label of the metric (generated from user agent string).
```

1.18. Monitoring
where:

- `valid_from` and `valid_to` are timestamps of data aggregation period
- `data` is a list of value rows. When `data` is empty, that means no data were collected for input params.
- each `data` element contains:
  - `label` label value associated with metric data value. This can describe user-provided differentiation value (user agent string, request method etc), or, if such value is not in use, default, “count” or “value” label.
  - `val` is metric data aggregated value, which should be used by frontend application. For `request.ua` this means count of requests for given user agent string, for `response.time` that will return average response time.
  - `min`, `max`, `sum` are helper statistical values to give insight on data used,
  - `samples_count` is a sum of all samples counts (actual requests) used for this calculation
  - `metric_count` is a number of metric data used to calculate the value.
  - `resource` (optional) key with resource structure `(id, name, type)`. This element will be visible when grouping by resource is used.
  - `event_type` (optional) key with name of event type related to rest of row. This element will be visible when grouping by event type is used

Metric data can be filtered with following params:

- `valid_from` timestamp (date or date + time) meaning that data should be newer than this timestamp
- `valid_to` timestamp (date or date + time) meaning that data should be older than this timestamp
• **interval** data aggregation interval, in seconds. See below notes about intervals and timestamps alignment

• **label** label value only for which data should be returned (see [Labels](#labels))

• **resource** id of resource (see [Resources](#resources)) for which data should be returned

• **service** name of service (see [Services](#services)) for which data should be returned

• **event_type** name of service (see [Event Types](#ows_service)) for which data should be returned

• **resource_type** name of resource type to filter by, for example layer to show only data for layer objects (exclude urls, documents, maps).

### grouping metric data

Additionally, in some cases client application may want to receive list of data points in one period for several resources (typical usage scenario: list top-most requested layers). In such case, metric data should be queried also with following params:

• **group_by** - name of object which should be used for grouping. At the moment two grouping modes are available:

  – **resource** - group by resource affected. This will produce metrics for the same label but each resource affected will be listed separately. Returned metric data items will have additional resource key, which will hold dictionary with keys `name` and `type`. Sample response:

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

    ```json
    {
        "data": {
            "input_valid_from": "2017-09-01T00:00:00",
            "input_valid_to": "2017-09-08T13:50:34.024",
            "data": [
                {
                    "valid_from": "2017-09-04T00:00:00",
                    "data": [
                        {
                            "resource": {
                                "type": "layer",
                                "name": "nurc:Arc_Sample"
                            },
                            "samples_count": 300,
                            "val": "300.0000",
                            "min": "100.0000",
                            "max": "100.0000",
                            "sum": "300.0000",
                            "label": "count",
                            "metric_count": 3,
                            "id": 10
                        },
                        {
                            "resource": {
                                "type": "layer",
                                "name": "sde:HYP_HR_SR_OB_DR"
                            },
                            "samples_count": 72,
                        }
                    ]
                }
            ]
        }
    }
    ```

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- resource_no_labels - group by resource affected, but do not distinct by label. This will produce similar result as the other grouping, but it will not contain ‘label’ key.

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

{  "data":  {    "input_valid_from": "2018-07-10T15:13:50.784Z",    "input_valid_to": "2018-07-11T15:13:50.784Z",    "data": [      {        "id_from": "2018-07-10T15:13:50.784Z",        "data": [          {            "resource": {              "type": "url",              "name": "/layers/",              "id": 15            },            "metric_count": 4,            "val": 2,            "min": "1.0000",            "max": "1.0000",            "sum": "4.0000",            "samples_count": 4          },          {            "resource": {              "type": "url",              "name": "/"            },            "metric_count": 4,            "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"      },      {        "id": 25      }    ],    "valid_to": "2017-09-09T00:00:00"  }

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"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"}
GeoNode Documentation, Release 3.2.1

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```json
{
  "metric": "request.users",
  "interval": 86400,
  "type": "value",
  "axis_label": "Count",
  "label": null
}
```

- **label** - group by label. This will return number of unique label occurrences within selected period.

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

```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
    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
    chunks = self.iterencode(o, _one_shot=True)
    File "/usr/lib64/python2.7/json/encoder.py", line 270, in iterencode
    return _iterencode(o, 0)
    File "/home/cezio/.virtualenvs/geonode/lib/python2.7/site-packages/django/core/serializers/json.py", line 115, in default
    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",
    "service": {
        "type": "geonode",
        "name": "local-geoserver"
    },
    "error_type": "exceptions.TypeError",
    "request": {
        "event_type": null
    }
}"
```

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"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/

```
{
    "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

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

```json
{
    "data": {
        "input_valid_from": "2018-07-11T17:54:41.467Z",
        "input_valid_to": "2018-07-12T17:54:41.467Z",
        "data": [
            {
                "valid_from": "2018-07-11T17:54:41.467Z",
                "data": [
                    {
                        "samples_count": 5,
                        "event_type": "all",
                        "val": 2,
                        "min": "1.0000",
                        "max": "1.0000",
                        "sum": "5.0000",
                        "metric_count": 5
                    }
                ]
            }
        ]
    }
}
```
• 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
{
  "data": {
    "input_valid_from": "2018-07-11T17:54:41.467Z",
    "input_valid_to": "2018-07-12T17:54:41.467Z",
    "data": [
      {
        "valid_from": "2018-07-11T17:54:41.467Z",
        "data": [
          {
            "samples_count": 5,
            "event_type": "all",
            "val": 2,
            "min": "1.0000",
            "max": "1.0000",
            "sum": "5.0000",
            "metric_count": 5
          },
          {
            "samples_count": 5,
            "event_type": "view",
            "val": 2,
            "min": "1.0000",
            "max": "1.0000",
            "sum": "5.0000",
            "metric_count": 5
          }
        ]
      },
    ]
  }
}
```
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
},
"metric_count": 16,
"val": 16,
"min": "1.0000",
"max": "1.0000",
"sum": "16.0000",
"samples_count": 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=31536000&event_type=upload&group_by=user

- number of unique visitors (users) in a given time interval and for a given resource_type.
GET /monitoring/api/metric_data/request.users/?valid_from=2019-01-01+00:00:00&valid_to=2019-12-31+23:59:59&interval=31536000&resource_type=layer&group_by=user

the responses should look like this:

```json
{
  "data": {
    "input_valid_from": "2019-01-01T00:00:00Z",
    "input_valid_to": "2019-12-31T23:59:59Z",
    "data": [
      {
        "valid_from": "2019-01-01T00:00:00Z",
        "data": [
          {
            "samples_count": 3,
            "val": 2,
            "min": "1.0000",
            "max": "2.0000",
            "sum": "3.0000",
            "metric_count": 2
          }
        ],
        "valid_to": "2020-01-01T00:00:00Z"
      }
    ],
    "metric": "request.users",
    "interval": 31536000,
    "type": "value",
    "axis_label": "Count",
    "label": null
  }
}
```

6. total number of unique tracking ids/sessions for a given user.

- sessions count for anonymous users:

GET /monitoring/api/metric_data/request.users/?valid_from=2019-01-01+00:00:00&valid_to=2019-12-31+23:59:59&interval=31536000&group_by=label&user=AnonymousUser

```json
{
  "data": {
    "input_valid_from": "2019-01-01T00:00:00Z",
    "input_valid_to": "2019-12-31T23:59:59Z",
    "data": [
      {
        "valid_from": "2019-01-01T00:00:00Z",
        "data": [
          {
            "samples_count": 5,
            "val": 5,
            "min": "1.0000",
            "max": "1.0000",
            "sum": "5.0000",
            "metric_count": 5
          }
        ]
      }
    ]
}
```

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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": 1
          }
        ]
      }
    ]
  }
}```
• 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

```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": 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

```json
{
    "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": "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": "",
  "type": "layer",
  "name": "geonode:waterways",
  "id": 7
},
  "metric_count": 1,
  "val": 1,
  "max": "1.0000",
  "sum": "1.0000",
  "min": "1.0000",
  "samples_count": 1
}
9. total number of resource monitored in a given time range.

GET /monitoring/api/metric_data/request.users/?last=31536000&interval=31536000&group_by=count_on_resource

```json
{
  
  "data": {
    "input_valid_from": "2018-09-10T14:20:27.335Z",
    "input_valid_to": "2019-09-10T14:20:27.335Z",
    "data": [
      {
        "valid_from": "2018-09-10T14:20:27.335Z",
        "data": [
        {
          "samples_count": 52,
          "val": 7,
          "min": "0.0000",
          "max": "2.0000",
          "sum": "52.0000",
          "metric_count": 53
        }
      ],
      "valid_to": "2019-09-10T14:20:27.335Z"
    }
  },
  "metric": "request.users",
  "interval": 31536000,
  "type": "value",
  "axis_label": "Count",
  "label": null
}
```
1.18.4 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_thresholds` data, and is used to generate validation form. Note, that one `NotificationCheck` can have several definition items, for set of different metrics. Definition rows are created when `NotificationCheck` is created, or updated.

- **Per-metric check configuration:** `MetricNotificationCheck`:
  Keeps per-metric-per-check configuration: metric and threshold values. It is created after user submits configuration form for specific notification.

Workflow

Notifications are checked after each collection/processing period in collection script, by calling `CollectorAPI.emit_notifications(for_timestamp)`. This will do following:

- get all notifications,
- for each notification, will get all notification checks
- for each notification check, it will get metric valid for given timestamp and check if value matches given criteria
- each check can raise exception, which will be captured in caller, and for each notification, list of errors will be returned
- based on list of notifications and errors, alerts will be generated and send to users, unless last delivery was before grace period is finished.

Additionally, notifications expose `/monitoring/api/status/ Status API`, which will show errors detected at the moment of request.
1.18.5 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,
            "description": "Number of handled requests is higher than"
          }
        }
      }
    }
  ]
}
```

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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}}/
```

```
{
    "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": "dsfdsf",
  "max_value": null,
  "metric": {
    "class": "geonode.contrib.monitoring.models.Metric",
    "name": "response.time",
    "id": 11
  },
  "min_value": null,
  "use_label": false,
  "use_ows_service": false,
  "field_option": "min_value",
  "use_service": false,
  "steps_calculated": null,
  "current_value": null,
  "steps": null,
  "notification_check": {
    "class": "geonode.contrib.monitoring.models.NotificationCheck",
    "name": "geonode is not working",
    "id": 2
  },
  "field_name": "response.time.min_value",
  "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" selected="selected">10.0</option>
</select></td></tr>
<tr><th><label for="id_request.count.max_timeout">Request.count.max_timeout:</label></th><td><input id="id_request.count.max_timeout" name="request.count.max_timeout" type="number" value="00:01:00" /></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" type="number" value="500.0000" /></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" type="number" value="0.01" /></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": 
  }
(continues on next page)
"max": null,
"metric": "request.count",
"steps": null,
"description": "No response for at least",
"min": 60
},
"response.time.max_value": {
"max": null,
"metric": "response.time",
"steps": null,
"description": "Response time is higher than",
"min": 500
},
"request.count.min_value": {
"max": 10,
"metric": "request.count",
"steps": 3,
"description": "Number of handled requests is lower than",
"min": 0
}
},
"active": true,
"id": 2,
"name": "geonode is not working"
}
},
"success": true
}

Returned keys in data element:

- **fields** - list of form fields, including detailed per-resource configuration flags
- **form** - rendered user form, which can be displayed
- **notification** - serialized notification object with user_thresholds list (this is a base to create fields objects)

Frontend should use fields list to create whole form in client-side:

- field name is stored in field_name.
- field label can be constructed from description
- unit can be extracted from unit field
- if field definition provides list in steps_calculated, this should be used to construct selection/dropdown, otherwise text input should be displayed. If possible, validation should take into account min_value and max_value.
- currently set value is available in current_value field.
- each field has is_enabled property, which tells if field is enabled. Currently this value is calculated in following way: field is enabled if current_value is not None. This may change in the future.

Additionally, each notification configuration accepts list of emails in emails field. This field should be send as a list of emails joined with new line char (n).

Form should be submitted to the same url as configuration source (/monitoring/api/notifications/config/{id}/), see below.
Notification edition (by user)

Following API call allows user to configure notification by setting receivers and adjust threshold values for checks:

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

request.count.max_value=val
request.count.min_value=1
emails=list of emails

Response contains serialized NotificationCheck in data element, if no errors were captured during form processing:

```json
{
   "status": "ok",
   "errors": {},
   "data": {
      "grace_period": {
         "seconds": 600,
         "class": "datetime.timedelta"
      },
      "last_send": null,
      "description": "more test",
      "severity": "error",
      "user_threshold": {
         "request.count.max_value": {
            "max": null,
            "metric": "request.count",
            "steps": null,
            "description": "Max number of request",
            "min": 1000
         },
         "request.count.min_value": {
            "max": 100,
            "metric": "request.count",
            "steps": null,
            "description": "Min number of request",
            "min": 0
         }
      },
      "id": 293,
      "name": "test"
   },
   "success": true
}
```

Error (non-200) response will have errors key populated:

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

```
name=Name of notification (geonode doesn't work)
description=This will check if geonode is serving any data
emails=
user_thresholds=
severity=
```

Payload elements:

- `name`, `description` are values visible for user
- `severity` severity value
- `emails` is a list of emails, however, it is encoded to a string, where each email is in new line:

```
email1@test.com
email2@test.com
```

- `user_thresholds` is a json encoded list of per-metric-per-check configurations. Each element of list should be a 10-element list, containing:
  - name of metric
  - field check option (one of three values: `min_value`, `max_value` or `max_timeout`)
  - flag, if metric check can use service
  - flag, if metric check can use resource
  - flag, if metric check can use label
  - flag, if metric check can use ows service
  - minimum value for user input (no minimum check if None)
  - maximum value for user input (no maximum check if None)
  - steps count is a number of steps to generate for user input, so user can select value from select list instead of typing. This will have effect only if both min and max values are also provided Sample payload for `user_thresholds`:

```

```
Response is a serialized `NotificationCheck` wrapped with standard response envelope (status, errors etc). Actual data is in `data` key. If processing failed, for example because of form validation errors, response will be non-200 OK, and `errors` key will be populated.

```json
{
  "status": "ok",
  "errors": {},
  "data": {
    "grace_period": {
      "seconds": 600,
      "class": "datetime.timedelta"
    },
    "last_send": null,
    "description": "more test",
    "user_threshold": {
      "request.count.max_value": {
        "max": 100,
        "metric": "request.count",
        "steps": null,
        "description": "Min number of request",
        "min": 0
      },
      "request.count.min_value": {
        "max": null,
        "metric": "request.count",
        "steps": null,
        "description": "Max number of request",
        "min": 1000
      }
    },
    "id": 257,
    "name": "test"
  },
  "success": true
}
```
1.19 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,oauth2_provider/services/sites,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,oauth2_provider/services/sites,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

```
[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:

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

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

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

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

Restore

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

# -c / --config: path to the settings.ini configuration file. If the Backup archive is provided with its 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:

```
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 its data.

The detailed view of the restored backup shows backup archive’s name, its MD5 hash, its 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)

```
$> docker ps
CONTAINER ID IMAGE COMMAND CREATED ⬢ STATUS PORTS ⬢ NAMES
-lasting 1e9fc97a75d1a 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
-lasting 1c5496400b1b9 my_geonode_django "/bin/sh -c 'service..." 2 hours ago Up 2 hours my_geonode_django
-lasting 1bc899f81fa28 my_geonode_celery "/bin/sh -c 'service..." 2 hours ago Up 2 hours my_geonode_celery
-lasting 13b213400d630 geonode/geoserver:2.17.1 "/usr/local/tomcat/t..." 2 hours ago Up 2 hours 8080/tcp geoserver4my_geonode
-lasting 1d2f59d70a0d3 geonode/postgis:11 "docker-entrypoint.s..." 2 hours ago Up 2 hours 5432/tcp 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
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.

Provide the administrator credentials as requested

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

Well done, Jenkins is ready now

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

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

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

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

Click on Available tab and search for SSH available plugins

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
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

[Password field]

Continue
Customize Jenkins

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

- **Install suggested plugins**
  Install plugins the Jenkins community finds most useful.

- **Select plugins to install**
  Select and install plugins most suitable for your needs.
## Getting Started

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folders</td>
<td>✔</td>
</tr>
<tr>
<td>OWASP Markup Formatter</td>
<td>✔</td>
</tr>
<tr>
<td>Build Timeout</td>
<td>✔</td>
</tr>
<tr>
<td>Credentials Binding</td>
<td>✔</td>
</tr>
<tr>
<td>Timestamper</td>
<td>✔</td>
</tr>
<tr>
<td>Workspace Cleanup</td>
<td>✔</td>
</tr>
<tr>
<td>Ant</td>
<td>✔</td>
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<tr>
<td>Gradle</td>
<td>✔</td>
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<td>Pipeline</td>
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<td>Pipeline: Stage View</td>
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<td>Matrix Authorization Strategy</td>
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<td>✔</td>
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<tr>
<td>Mailer</td>
<td>✔</td>
</tr>
</tbody>
</table>

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**Jenkins 2.231.2**

1.19. GeoNode Backup and Restore
Create First Admin User

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

Save and Continue
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.
Getting Started

Jenkins is ready!

Your Jenkins setup is complete.

Start using Jenkins
Welcome to Jenkins!

- Create an agent or configure a cloud to set up distributed builds. Learn more.
- Create a job to start building your software project.

Build Queue
No builds in the queue.

Build Executor Status
1. Idle
2. Idle
1.19. 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
### Manage Jenkins

**System Configuration**
- **Configure System**: Configure global settings and paths.
- **Global Tool Configuration**: Configure tools, their locations and automatic installers.
- **Manage**: Add, remove or extend Jenkins plugins.

**Security**
- **Configure Global Security**: Secure Jenkins; define who is allowed to access/use the system.
- **Manage Credentials**: Configure credentials.
- **Configure Types**: Configure types.

**Status Information**
- **System Information**: Displays various environmental information to assist troubleshooting.
- **System Log**: System log captures output from java.util.logging output related to Jenkins.
- **Load**: Check you next.

---

1.19. GeoNode Backup and Restore

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Page dimensions: 612.0x792.0

GeoNode Documentation, Release 3.2.1
It is possible also to run and configure Jenkins to run locally, as an instance on localhost. In that case you will need to change few things in order to allow Jenkins to access your local network.

1. First of all, be sure OpenSSH Server is correctly installed and running on your PC. Eventually check any firewall rules.

   ```
   $> sudo apt install openssh-server
   # Test your connection locally
   $> ssh -p 22 user@localhost
   user@localhost's password:
   ```

2. You will need to do some changed to your docker-compose.yml file in order to enable the host network configuration.

   **Note:** Enable network_mode: "host" on Jenkins container
$> vim docker-compose.yml

...  
jenkins:  
  image: jenkins/jenkins:lts  
  # image: istresearch/jenkins:latest  
  container_name: jenkins4${COMPOSE_PROJECT_NAME}  
  user: jenkins  
  ports:  
    - '${JENKINS_HTTP_PORT}:${JENKINS_HTTP_PORT}'  
    - '${JENKINS_HTTPS_PORT}:${JENKINS_HTTPS_PORT}'  
    - '50000:50000'  
  network_mode: "host"  
  volumes:  
    - jenkins_data:/var/jenkins_home  
    - backup-restore:/backup_restore  
    # - /var/run/docker.sock:/var/run/docker.sock  
  environment:  
    - 'JENKINS_OPTS=--httpPort=${JENKINS_HTTP_PORT} --httpsPort=${JENKINS_HTTPS_PORT} --prefix=/jenkins'  
...  

# Recreate the Jenkins container  
$> docker-compose stop jenkins  
$> docker-compose rm jenkins  
$> docker-compose up -d jenkins  

Warning: From now on, your local Jenkins instance will be accessible from http://localhost:9080/jenkins

3. Add localhost Server to the Publish over SSH plugin configuration

Mode to http://localhost:9080/jenkins/configure and fill the required information

Note: Before saving the configuration always ensure the connection is ok by using the Test Configuration button

We are now ready to create the Jenkins Job which will run a full backup & restore of our GeoNode dockerized instance.

1. Move to the Jenkins Home and click on Create a Job button
2. Provide a name to the Job and select Freestyle project
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

   **Warning:** Provide the correct URL of your GeoNode instance

   3. TARGET_URL
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: $BP_FOLDER_NAME
Default Value: backup_restore
Description: Shared Backup Folder name. The scripts assume it is located on "root" e.g.: /$BP_FOLDER_NAME/

[Plain text] Preview
Trim the string

String Parameter

Name: SOURCE_URL
Default Value: http://localhost
Description: Source Server URL, the one generating the "backup" file.

[Plain text] Preview
Trim the string
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.

```
$> 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
```
1.20 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/](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:

```
# 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 order to check for user's credentials.

In other words, GeoServer takes a username and a password encoded Base64 on the HTTP Request Headers and compare them against its internal database (which by default is an encrypted XML file on the GeoServer Data Dir). If the user’s credentials match, then GeoServer checks for Authorization through
its **Role Services** (we will see those services in details on the *GeoServer (Security Backend)* section below).

**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)*

OAuth2 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 userinfo endpoint with the access token received from OAuth2 provider
5. The userinfo 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:

```
... 
AUTH_IP_WHITELIST = []
...
```
**INSTALLED_APPS**

In order to allow GeoNode to act as an OAuth2 Provider, we need to enable the `oauth2_provider` Django application provided by the “Django OAuth Toolkit”.

Default values are:

```python
INSTALLED_APPS = (
    'modeltranslation',
    ...
    'guardian',
    'oauth2_provider',
    ...
) + GEONODE_APPS
```

**MIDDLEWARE_CLASSES**

Installing the `oauth2_provider` Django application is not sufficient to enable the full functionality. We need also GeoNode to include additional entities to its internal model.

Default values are:

```python
MIDDLEWARE_CLASSES = (
    'django.middleware.common.CommonMiddleware',
    'django.contrib.sessions.middleware.SessionMiddleware',
    'django.contrib.messages.middleware.MessageMiddleware',
    # The setting below makes it possible to serve different languages per
    # user depending on things like headers in HTTP requests.
    'django.middleware.locale.LocaleMiddleware',
    'pagination.middleware.PaginationMiddleware',
    'django.middleware.csrf.CsrfViewMiddleware',
    'django.contrib.auth.middleware.AuthenticationMiddleware',
    'django.middleware.clickjacking.XFrameOptionsMiddleware',
    ...
)
```
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
     ```bash
     python manage.py makemigrations
     python manage.py migrate
     python manage.py syncdb
     ```
   - Prepare the static data
     ```bash
     python manage.py collectstatic
     ```
   - Make sure the database has been populated with initial default data
     ```bash
     Warning: Deprecated this command will be replaced by migrations in the future, so be careful.
     python manage.py loaddata initial_data.json
     ```
   - Make sure there exists a superuser for your environment
2. Start the application

Start GeoNode accordingly on how the setup has been done; run debug mode through \texttt{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 \texttt{GeoServer} through the GeoNode Admin Dashboard

- Access the GeoNode Admin Dashboard

- Go to Django OAuth Toolkit > Applications

- Update or create the Application named \texttt{GeoServer}

\textbf{Warning:} The Application name \textbf{must} be GeoServer

- Client id: An alphanumeric code representing the OAuth2 Client Id. GeoServer OAuth2 Plugin \textbf{will} use this value.

\textbf{Warning:} In a production environment it is \textbf{highly} recommended to modify the default value provided with GeoNode installation.

- User: Search for the admin user. Its ID will be automatically updated into the form.

- Redirect uris: It is possible to specify many URIs here. Those must coincide with the GeoServer instances URIs.

- Client type: Choose Confidential

- Authorization grant type: Choose Authorization code

- Client secret: An alphanumeric code representing the OAuth2 Client Secret. GeoServer OAuth2 Plugin \textbf{will} use this value.

\textbf{Warning:} In a production environment it is \textbf{highly} recommended to modify the default value provided with GeoNode installation.

- Name: Must be GeoServer
GeoServer Security Subsystem

GeoServer has a robust security subsystem, modeled on Spring Security. Most of the security features are available through the Web administration interface.

For more details on how this works and how to configure and modify it, please refer to the official GeoServer guide http://docs.geoserver.org/stable/en/user/security/webadmin/index.html

By using the GeoServer Data Dir provided with GeoNode build, the following configuration are already available. You will need just to update them accordingly to your environment (like IP addresses and Host names, OAuth2 Keys, and similar things). However it is recommended to read carefully all the following passages in order to understand exactly how the different component are configured and easily identify any possible issue during the deployment.

The main topics of this section are:

1. Connection to the GeoNode REST Role Service
2. Setup of the GeoServer OAuth2 Authentication Filter
3. Configuration of the GeoServer Filter Chains
4. Setup and test of the GeoFence Server and Default Rules
Connection to the GeoNode REST Role Service

Preliminary checks

- GeoServer is up and running and you have admin rights
- GeoServer must reach the GeoNode instance via HTTP
- The GeoServer Host IP Address must be allowed to access the GeoNode Role Service APIs (see the section AUTH_IP_WHITELIST above)

Setup of the GeoNode REST Role Service

1. Login as admin to the GeoServer GUI

   Warning: In a production system remember to change the default admin credentials admin geoserver

2. Access the Security > Users, Groups, Roles section

3. If not yet configured the service geonode REST role service, click on Role Services > Add new

   Note: This passage is not needed if the geonode REST role service has been already created. If so it will be displayed among the Role Services list
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>AuthTHREE 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

Configure global security settings
Users, Groups, Roles

1.20. GeoNode Components and Architecture
Security Settings

Configure security settings

Active role service

![Role Service List]

- geonode REST role service
- default
- geonode REST role service

- Encrypt web admin URL parameters
- Password encryption

Weak PBE

⚠️ No strong cryptography available

Save  Cancel

GeoServer 2.12.x and above

With the latest updates to GeoFence Plugin, the latter no more recognizes the Role Service from the default settings but from the `geofence-server.properties` file.

That said, it is important that the Security > Settings role service will be set to default, in order to allow GeoServer following the standard authorization chain.

On the other side, you will need to be sure that the `geofence-server.properties` file under the `$GEOSERVER_DATA_DIR/geofence` folder, contains the two following additional properties:

```
gwc.context.suffix=gwc
org.geoserver.rest.DefaultUserGroupServiceName=geonode REST role service
```

Setup of the GeoServer OAuth2 Authentication Filter

It is necessary now check that GeoServer can connect to OAuth2 Providers (specifically to GeoNode OP), and being able to Authenticate users through it.

Preliminary checks

- GeoServer is up and running and you have admin rights
- GeoServer must reach the GeoNode instance via HTTP
- OAuth2 Client ID and Client Secret have been generated on GeoNode and known
Setup of the GeoNode OAuth2 Security Filter

1. Access the Security > Authentication section

   ![Security Settings](image)

2. **If not yet configured** the Authentication Filter geonode-oauth2 - Authentication using a GeoNode OAuth2, click on Authentication Filters > Add new

   ![Authentication Filters](image)

   Note: This passage is not needed if the geonode-oauth2 - Authentication using a GeoNode OAuth2 has been already created. If so it will be displayed among the Authentication Filters list.

3. **If not yet configured** the Authentication Filter geonode-oauth2 - Authentication using a GeoNode OAuth2, choose GeoNode OAuth2 - Authenticates by looking up for a valid GeoNode OAuth2 access_token key sent as URL parameter.

4. Create / update the geonode-oauth2 - Authentication using a GeoNode OAuth2 accordingly
   - Name: **Must** be geonode-oauth2
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 CAuth2 access_token key sent as URL parameter

Authentication using a GeoNode OAuth2 geonode-oauth2

Authenticate 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

Login Authentication Endpoint
/j_spring_oauth2_geonode_login

Logout Authentication Endpoint
/j_spring_oauth2_geonode_logout

Force Access Token URI HTTPS Secured Protocol

Access Token URI

• Enable Redirect Authentication EntryPoint: It is recommended to put this to False, otherwise GeoServer won't allow you to connect to its Admin GUI through the Form but only through GeoNode

• Login Authentication Endpoint: Unless you have specific needs, keep the default value /j_spring_oauth2_geonode_login

• Logout Authentication Endpoint: Unless you have specific needs, keep the default value /j_spring_oauth2_geonode_logout

• Force Access Token URI HTTPS Secured Protocol: This must be False unless you enabled a Secured Connection on GeoNode. In that case you will need to trust the GeoNode Certificate on the GeoServer JVM Keystore. Please see details below

• Access Token URI: Set this to http://<geonode_host_base_url>/o/token/

• Force User Authorization URI HTTPS Secured Protocol: This must be False unless you enabled a Secured Connection on GeoNode. In that case you will need to trust the GeoNode Certificate on the GeoServer JVM Keystore. Please see details below

• User Authorization URI: Set this to http://<geonode_host_base_url>/o/authorize/

• Redirect URI: Set this to http://<geoserver_host>/geoserver. This address must be present on the Redirect uris of GeoNode OAuth2 Applications > GeoServer (see above)

• Check Token Endpoint URL: Set this to http://<geonode_host_base_url>/api/o/v4/tokeninfo/

• Logout URI: Set this to http://<geonode_host_base_url>/account/logout/
• **Scopes**: Unless you have specific needs, keep the default value `read,write,groups`

• **Client ID**: The Client id alphanumeric key generated by the GeoNode OAuth2 Applications > GeoServer (see above)

• **Client Secret**: The Client secret alphanumeric key generated by the GeoNode OAuth2 Applications > GeoServer (see above)

• **Role source**: In order to authorize the user against GeoNode, choose Role service > geonode REST role service

**Configuration of the GeoServer Filter Chains**

The following steps ensure GeoServer can adopt more Authentication methods. As stated above, it is possible to Authenticate to GeoServer using different protocols.

GeoServer scans the authentication filters chain associated to the specified path and tries them one by one sequentially. The first one matching the protocol and able to grant access to the user, breaks the cycle by creating a User Principal and injecting it into the GeoServer SecurityContext. The Authentication process, then, ends here and the control goes to the Authorization one, which will try to retrieve the authenticated user’s Roles through the available GeoServer Role Services associated to the Authentication Filter that granted the access.

**Preliminary checks**

• GeoServer is up and running and you have admin right

• GeoServer must reach the GeoNode instance via HTTP

• The geonode-oauth2 - Authentication using a GeoNode OAuth2 Authentication Filter and the geonode REST role service have been correctly configured

**Setup of the GeoServer Filter Chains**

1. Access the Security > Authentication section

2. Identify the section Filter Chains

3. Make sure the web Filter Chain is configured as shown below

   **Warning:** Every time you modify a Filter Chain, **don’t forget to save** the Authentication settings. This **must** be done for **each** change.
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

![Filter Chain Configuration](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

Warning: Every time you modify a Filter Chain, don’t 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

**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)
`filter2_geonode_login,/j_spring_oauth2_geonode_login`  

- Disable security for this chain
- Allow creation of an HTTP session for storing the authentication token
- Accept only SSL requests

**Warning:** Every time you modify a Filter Chain, don’t forget to save the Authentication settings. This must be done for each change.
8. Add the GeoNode Logout Endpoints to the comma-delimited list of the webLogout Filter Chain

Filter chain

Configure an individual filter chain

Chain settings

Name

webLogout

Comma delimited list of ANT patterns (with optional query string)

2_geonode_logout,ji_spring_oauth2_geonode_logout

- Disable security for this chain
- Allow creation of an HTTP session for storing the auth
- Accept only SSL requests

Role filter

Warning: Every time you modify a Filter Chain, don’t forget to save the Authentication settings. This must be done for each change.

   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_geonode_logout` **must** be the same specified as Logout Authentication EndPoint in the geonode-oauth2 - Authentication using a GeoNode OAuth2 above.
Setup and test of the GeoFence Server and Default Rules

In order to work correctly, GeoServer needs the GeoFence Embedded Server plugin to be installed and configured on the system.

The GeoServer configuration provided for GeoNode, has the plugin already installed with a default configuration. In that case double check that the plugin works correctly and the default rules have been setup by following the next steps.

Preliminary checks

- GeoServer is up and running and you have admin rights
- The GeoFence Embedded Server plugin has been installed on GeoServer

Setup of the GeoServer Filter Chains

1. Access the Security > Authentication section

2. Identify the section Authentication Providers and make sure the geofence Authentication Provider is present

3. Make sure the Provider Chain is configured as shown below

   Warning: Every time you modify 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](image)
- ![Remove selected rules](image)

<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>D</td>
<td>&quot; &quot;</td>
<td>&quot; &quot;</td>
<td>&quot; &quot;</td>
<td>&quot; &quot;</td>
<td>&quot; &quot;</td>
<td>&quot; &quot;</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
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...
of the problem. If no exception is listed here (even after raised the log level to `DEBUG`), try to check for the GeoNode Role Service as explained below.

- Another possible issue is that somehow the OAuth2 handshake cannot complete successfully;
  
  1. Login into GeoServer as administrator through its WEB login form.
  
  2. Double check that all the `geonode-oauth2` parameters are correct. If everything is ok, take a look at the logs (in particular the GeoServer one) as explained in `debug_geonode`. The GeoServer logs should contain a detailed Exception explaining the cause of the problem. If no exception is listed here (even after raised the log level to `DEBUG`), try to check for the GeoNode Role Service as explained below.

2. GeoServer is not able to retrieve the user Role from a Role Service

Always double check both HTTP Server and GeoServer log as specified in section `debug_geonode`. This might directly guide you to the cause of the problem.

- Check that the GeoServer host is granted to access GeoNode Role Service REST APIs in the `AUTH_IP_WHITELIST` of the settings.py
- Check that the `geonode REST role service` is the default Role service and that the GeoServer OAuth2 Plugin has been configured to use it by default
- Check that the GeoNode REST Role Service APIs are functional and produce correct JSON.

This is possible by using simple cUrl GET calls like

```
curl http://localhost/api/adminRole
$> {"adminRole": "admin"}

curl http://localhost/api/users
$> {"users": [{"username": "AnonymousUser", "groups": ["anonymous"]}, {"username": "afabiani", "groups": ["anonymous", "test"]}, {"username": "admin", "groups": ["anonymous", "test", "admin"]}]

curl http://localhost/api/roles
$> {"groups": ["anonymous", "test", "admin"]}

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>
      
      ```bash
      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

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  1.20. GeoNode Components and Architecture


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  GeoNode Documentation, Release 3.2.1
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.
GeoNode Documentation, Release 3.2.1

1.20. GeoNode Components and Architecture

KeyStore type: JKS, provider: SUN, size: 3 entries
<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 11:09:03 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

The certificate information will now be displayed after which you may confirm whether or not you trust the certificate.
### 1.20. GeoNode Components and Architecture

#### F:\tmp\keystore.key - Portecl

<table>
<thead>
<tr>
<th>Alias Name</th>
<th>Last Modified</th>
</tr>
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<tr>
<td>* googleapis.com (google internet authority g2)</td>
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</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

![Certificate Import Dialogue](image)
1.20. GeoNode Components and Architecture
Keyframe type: JKS, provider: SUN, size: 3 entries
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/postgis-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
   restart geoserver

2. Either create a DB with the updated schema here https://github.com/geoserver/geofence/blob/master/doc/setup/sql/002_create_schema_postgres.sql or enable the hbm2ddl auto creation through the configuration file (see step 3)
Note: Notice that “update” also creates the tables if they do not exist. In production, however, I would suggest to change it to “validate”

```sh
# If you want to create a new DB for GeoFence
sudo -u postgres createdb -O geonode geofence;
sudo -u postgres psql -d geofence -c 'CREATE EXTENSION postgis;';
sudo -u postgres psql -d geofence -c 'GRANT ALL ON geometry_columns TO PUBLIC;';
sudo -u postgres psql -d geofence -c 'GRANT ALL ON spatial_ref_sys TO PUBLIC;';
sudo -u postgres psql -d geofence -c 'GRANT ALL PRIVILEGES ON ALL TABLES IN SCHEMA public TO geonode;'
```

3. Add configuration similar to `geofence-datasource-ovr.properties` sample below (if loaded as GeoServer extension)

```
<GEOSERVER_DATA_DIR>/geofence/geofence-datasource-ovr.properties

# /* (c) 2019 Open Source Geospatial Foundation - all rights reserved
# * This code is licensed under the GPL 2.0 license, available at the root
# * application directory.
# */

geofenceVendorAdapter.databasePlatform=org.hibernate.spatial.postgis.PostgisDialect
geofenceDataSource.driverClassName=org.postgresql.Driver
geofenceDataSource.url=jdbc:postgresql://localhost:5432/geofence
geofenceDataSource.username=postgres
geofenceDataSource.password=postgres
geofenceEntityManagerFactory.jpaPropertyMap[hibernate.default_schema]=public

###########################################################################
## Other setup entries
###########################################################################
## hbm2ddl.auto may assume one of these values:
## - validate: validates the DB schema at startup against the internal model. May fail on oracle spatial.
## - update: updates the schema, according to the internal model. Updating automatically the production DB is dangerous.
## - create-drop: drop the existing schema and recreates it according to the internal model. REALLY DANGEROUS, YOU WILL LOSE YOUR DATA.
## You may want not to redefine the property entirely, in order to leave the default value (no action).

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)
geofoenceEntityManagerFactory.jpaPropertyMap[hibernate.validator.autoregister_listeners]=false

## ShowSQL is set to true in the configuration file; putting showsql=false in this file, you can easily check that this override file has been properly applied.
# geofoenceVendorAdapter.generateDdl=false
# geofoenceVendorAdapter.showSql=false

## Set to "true" in specific use cases
# workspaceConfigOpo.showDefaultGroups=false

###########################################################################
#####
## Disable second level cache.
## This is needed in a geofence-clustered environment.
#geofoenceEntityManagerFactory.jpaPropertyMap[hibernate.cache.use_second_level_cache]=false

###########################################################################
#####
## Use external ehcache configuration file.
## Useful to change cache settings, for example diskStore path.
#geofoenceEntityManagerFactory.jpaPropertyMap[hibernate.cache.provider_configuration_file_resource_path]=file:/path/to/geofence-ehcache-override.xml

## 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,

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

Edit the following lines,

```
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

• 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

   Change social application

   Provider: LinkedIn

   Client id: 

   Secret key: 

   Key: 

   Sites: 

     Available sites

     Choose sites

     Choose all

     Remove all

   • 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:
   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 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>App Id</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Secret</td>
<td>Secret Key</td>
</tr>
</tbody>
</table>

6. Save

7. Go back to the Facebook Application Dashboard and select Settings

8. Add your App Domain
9. Click on Add Platform

10. Select Web Site
11. Add the URL

12. And Save
13. Go to Add Product

14. Select Facebook Login
15. Select Web

16. Go to Settings
17. Make sure Allow client OAuth and Access via OAuth Web are enabled

18. Add the valid redirect URIs:

```
http://geonode.geo-solutions.it/account/facebook/login/callback/
http://geondoe.geo-solutions.it/account/login/
```

19. Save
Login by using Existing Accounts on GeoNode

If you want to enable an already existing user account to login through social apps, you need to associate it to social accounts.

Usually this could be done only by the current user, since this operation requires authentication on its social accounts.

In order to do that you need to go to the User Profile Settings

Click on “Connected social accounts”
And actually connect them

---

**Account Connections**

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

**Add a 3rd Party Account**

- [LinkedIn](#)
- [Facebook](#)

**Account Connections**

You can sign in to your account using any of the following already connected third party accounts:

- Facebook account: Alessio Fabiani
- LinkedIn account: Alessio Fabiani

[Remove](#)
1.23 GeoNode Django Contrib Apps

1.23.1 Geonode auth via LDAP

This package provides utilities for using LDAP as an authentication and authorization backend for geonode.

The django_auth_ldap package is a very capable way to add LDAP integration with django projects. It provides a lot of flexibility in mapping LDAP users to geonode users and is able to manage user authentication.

However, in order to provide full support for mapping LDAP groups with geonode’s and enforce group permissions on resources, a custom geonode authentication backend is required. This contrib package provides such a backend, based on django_auth_ldap.

Installation

Installing this contrib package is a matter of:

1. Installing geonode
2. Installing system LDAP libraries (development packages needed)
3. Cloning this repository locally
4. Change to the ldap directory and install this contrib package

```
# 1. install geonode (not shown here for brevity)
# 2. install systemwide LDAP libraries
sudo apt install
   libldap2-dev
   libsasl2-dev

# 3. get geonode/contribs code
git clone https://github.com/GeoNode/geonode-contribs.git

# 4. install geonode ldap contrib package
cd geonode-contribs/ldap
pip install .
```

Configuration

1. Add geonode_ldap.backend.GeonodeLdapBackend as an additional auth backend.

```
# e.g. by updating your settings.py or local_settings.py
AUTHENTICATION_BACKENDS += (
    "geonode_ldap.backend.GeonodeLdapBackend",
)
```

You may use additional auth backends, the django authentication framework tries them all according to the order listed in the settings. This means that geonode can be setup in such a way as to permit internal organization users to login with their LDAP credentials, while at the same time allowing for casual users to use their facebook login (as long as you enable facebook social auth provider).

Note: The django's django.contrib.auth.backends.ModelBackend must also be used in order to provide full geonode integration with LDAP. However this is included by default on GeoNode settings

1.23. GeoNode Django Contrib Apps
# 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:

```
# 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,
)
```

(continues on next page)
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:

```
LDAP_SERVER_URL=ldap://<the_ldap_server>
LDAP_BIND_DN=uid=ldapinfo,cn=users,dc=ad,dc=example,dc=org
LDAP_BIND_PASSWORD=<something_secret>
LDAP_USER_SEARCH_DN=dc=ad,dc=example,dc=org
LDAP_USER_SEARCH_FILTERSTR=(&(uid=%(user)s)(objectClass=person))
LDAP_MIRROR_GROUPS=True
LDAP_GROUP_SEARCH_DN=cn=groups,dc=ad,dc=example,dc=org
LDAP_GROUP_SEARCH_FILTERSTR=(|(cn=abt1)(cn=abt2)(cn=abt3)(cn=abt4)(cn=abt5)(cn=abt6))
LDAP_GROUP_PROFILE_MEMBER_ATTR=uniqueMember
```

The configuration seen in the example above will allow LDAP users to login to geonode with their LDAP credentials. On first login, a geonode user is created from the LDAP user and its LDAP attributes cn and sn are used to populate the geonode user’s first_name and last_name profile fields.

Any groups that the user is a member of in LDAP (under the cn=groups, dc=ad, dc=example, dc=org search base and belonging to one of (|(cn=abt1)(cn=abt2)(cn=abt3)(cn=abt4)(cn=abt5)(cn=abt6)) 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.

```bash
*/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:

```bash
manage.sh

export $(grep -v '^#' /opt/geonode/my-geonode/.env | xargs -d 'n
') /home/<my_user>/.virtualenvs/geonode/bin/python /opt/geonode/my-geonode/manage.py $@
```

and the `/opt/geonode/my-geonode/.env` is something similar to the following one:

```bash
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)
GEOSERVER_PUBLIC_HOST=<geonode_public_host>
GEOSERVER_PUBLIC_LOCATION=https://<geonode_public_host>/geoserver/
GEOSERVER_WEB_UI_LOCATION=https://<geonode_public_host>/geoserver/
LDAP_SERVER_URL=ldap://<the_ldap_server>
LDAP_BIND_DN=uid=ldapinfo,cn=users,dc=ad,dc=example,dc=org
LDAP_BIND_PASSWORD=<something_secret>
LDAP_USER_SEARCH_DN=dc=ad,dc=example,dc=org
LDAP_USER_SEARCH_FILTERSTR=(uid=%(user)s)
LDAP_MIRROR_GROUPS=True
LDAP_GROUP_SEARCH_DN=cn=groups,dc=ad,dc=example,dc=org
LDAP_GROUP_SEARCH_FILTERSTR=(|(cn=abt1)(cn=abt2)(cn=abt3)(cn=abt4)(cn=abt5)(cn=abt6))
LDAP_GROUP_PROFILE_MEMBER_ATTR=uniqueMember
OGC_REQUEST_MAX_RETRIES=3
OGC_REQUEST_POOL_MAXSIZE=100
OGC_REQUEST_TIMEOUT=60
SIDETURL=https://<geonode_public_host>/
SITE_HOST_NAME=<geonode_public_host>
FREETEXT_KEYWORDS_READONLY=False
# Advanced Workflow Settings
ADMIN_MODERATE_UPLOADS=False
GROUP_MANDATORY_RESOURCES=False
GROUP_PRIVATE_RESOURCES=False
RESOURCE_PUBLISHING=False

Note: You might want to use the same /opt/geonode/my-geonode/.env for your UWSGI configuration too:

[uwsgi]
socket = 0.0.0.0:8000
uid = <my_user>
gid = www-data
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)
# limit-as = 1024 # avoid Errno 12 cannot allocate memory
harakiri-verbose = true
vacuum = true
thunder-lock = true

## 1.23.2 Geonode Logstash for centralized monitoring/analytics

This contrib app, along with the GeoNode internal monitoring app, lets administrators to configure a service for sending metrics data to a centralized server which comes with Logstash. So it will be possible to visualize stats and charts about one or more GeoNode instances outside the application. Having a server configured with the ELK stack, it is possible to visualize those information on a Kibana dashboard for example. If you manage more than one GeoNode instances, that server can receive data from many GeoNode(s) so it can make available both single-instance dashboards (referred to individual instances) and global dashboards (stats calculated on the whole set of instances).

**Warning:** The centralized monitoring service cannot be active if the settings variables `USER_ANALYTICS_ENABLED` and monitoring-enabled are set to `False`.

### Overview

By default, GeoNode will send data to the centralized server every **3600 seconds** (1 hour) so, if enabled, the monitoring app will collect 1-hour-aggregated data. This time interval can be configured, see the next paragraphs to know how. Formatted and compressed data will be sent on a TCP connection (on the 443 standard port by default) through a scheduled celery task which basically logs information via python-logstash-async.
Warning: This feature requires python-logstash-async.

Data and events formats

Each time the centralized monitoring service is called, 4 types of JSON formatted events are sent to the server:

1. Instance overview

   

   

   ```json
   {
     "format_version": "1.0",
     "instance": {
       "name": geonode instance HOSTNAME,
       "ip": geonode instance IP
     },
     "time": {
       "startTime": UTC now - 1 hour (default)
       "endTime": UTC now
     },
     "hits": total number of requests,
     "unique_visits": total number of unique sessions,
     "unique_visitors": total number of unique users,
     "registered_users": total number of registered users at the end time,
     "layers": total number of layers at the end time,
     "documents": total number of documents at the end time,
     "maps": total number of maps at the end time,
     "errors": total number of errors
   }
   ```

2. Resources details

   

   ```json
   {
     "format_version": "1.0",
     "instance": {
       "name": geonode instance HOSTNAME,
       "ip": geonode instance IP
     },
     "time": {
       "startTime": UTC now - 1 hour (default)
       "endTime": UTC now
     },
     "resources": [
       ...
       {
         "type": resource type,
         "name": resource name,
         "url": resource URL,
         "hits": total number of requests about this resource,
         "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

```
{
    "format_version": "1.0",
    "instance": {
        "name": geonode instance HOSTNAME,
        "ip": geonode instance IP
    },
    "time": {
        "startTime": UTC now - 1 hour (default)
    },
    "countries": [
        {
            "name": country name,
            "hits": total number of requests about the country
        },
        ...
    ]
}
```

4. UA (User Agent) Family details

```
{
    "format_version": "1.0",
    "instance": {
        "name": geonode instance HOSTNAME,
        "ip": geonode instance IP
    },
    "time": {
        "startTime": UTC now - 1 day
    },
    "ua_families": [
        {
            "name": UA family name,
            "hits": total number of requests about the UA family
        },
        ...
    ]
}
```

These messages will be gzip compressed in order to improve transport performances and they should be parsed by a logstash filter on the server side (see Logstash configuration).
Configuration

The centralized monitoring service is disabled by default because it needs the internal monitoring to be active and service-specific configurations.

GeoNode configuration

On the GeoNode side, all needed configurations can be set up from the Django admin interface. If enabled, the **GEONODE LOGSTASH** section will show the **Centralized servers** feature:

<table>
<thead>
<tr>
<th>GEONODE_LOGSTASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralized servers</td>
</tr>
</tbody>
</table>

Let's add one:
The **Host** IP address and the **Port** number are mandatory as well as the time **Interval** (3600 seconds by default) which defines the service invocation polling (so the time range on which data should be aggregated).

**Note:** Once the service configured, the user can test the configuration by clicking on **Test connection**. It will test the connection with the centralized server without saving the configuration.

Other settings come with a default value:

- **Db path** → the local Spatialite database to cache events between emitting and transmission to the Logstash server (log events are cached even across process restarts and crashes);
- **Socket timeout** → timeout in seconds for TCP connections;
- **Queue check interval** → interval in seconds to check the internal queue for new messages to be cached in the database;
- **Queue events flush interval** → interval in seconds to send cached events from the database to Logstash;
- **Queue events flush count** → count of cached events to send from the database to Logstash;
• **Queue events batch size** → maximum number of events to be sent to Logstash in one batch;

• **Logstash db timeout** → timeout in seconds to ‘connect’ the Spatialite database.

To better understand what these variables mean, it is recommended to read the python-logstash-asyn 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></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crontabs</td>
<td>+ Add</td>
<td>✉️ Change</td>
</tr>
<tr>
<td>Intervals</td>
<td>+ Add</td>
<td>✉️ Change</td>
</tr>
<tr>
<td>Periodic tasks</td>
<td>+ Add</td>
<td>✉️ Change</td>
</tr>
<tr>
<td>Solar events</td>
<td>+ Add</td>
<td>✉️ Change</td>
</tr>
</tbody>
</table>

The dispatch-metrics-task task:
The task details:

Select periodic task to change

<table>
<thead>
<tr>
<th>Periodic Task</th>
<th>Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>dispatch-metrics-task every 3600 seconds</td>
<td>✔️</td>
</tr>
<tr>
<td>delayed-security-sync-task every 60 seconds</td>
<td>✔️</td>
</tr>
<tr>
<td>celery.backend_cleanup: 0 4 * * * (m/d/d/M/Y)</td>
<td>✔️</td>
</tr>
</tbody>
</table>

3 periodic tasks

Change periodic task

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)

Delete

Save and add another

Save and continue editing

SAVE
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.
## Django administration

### GeoNode

<table>
<thead>
<tr>
<th>Site administration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts</td>
<td>+</td>
</tr>
<tr>
<td>Email addresses</td>
<td>+</td>
</tr>
<tr>
<td>Actstream</td>
<td>+</td>
</tr>
<tr>
<td>Actions</td>
<td>+</td>
</tr>
<tr>
<td>Follows</td>
<td>+</td>
</tr>
<tr>
<td>Announcements</td>
<td>+</td>
</tr>
<tr>
<td>Announcements</td>
<td>+</td>
</tr>
<tr>
<td>Dismissals</td>
<td>+</td>
</tr>
<tr>
<td>Authentication and Authorization</td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td>+</td>
</tr>
<tr>
<td>Avatar</td>
<td>+</td>
</tr>
<tr>
<td>Avatars</td>
<td>+</td>
</tr>
<tr>
<td>Backup/Restore</td>
<td>+</td>
</tr>
<tr>
<td>Restored backups</td>
<td>+</td>
</tr>
<tr>
<td>Base</td>
<td>+</td>
</tr>
<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>Menu items</td>
<td>+</td>
</tr>
<tr>
<td>Menus</td>
<td>+</td>
</tr>
</tbody>
</table>

Fig. 279: *The GeoNode Admin Interface*

### GeoNode

<table>
<thead>
<tr>
<th>Site administration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts</td>
<td>+</td>
</tr>
<tr>
<td>Email addresses</td>
<td>+</td>
</tr>
<tr>
<td>Actstream</td>
<td>+</td>
</tr>
<tr>
<td>Actions</td>
<td>+</td>
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<tr>
<td>Follows</td>
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<tr>
<td>Announcements</td>
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<tr>
<td>Announcements</td>
<td>+</td>
</tr>
<tr>
<td>Dismissals</td>
<td>+</td>
</tr>
<tr>
<td>Authentication and Authorization</td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td>+</td>
</tr>
<tr>
<td>Avatar</td>
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<tr>
<td>Avatars</td>
<td>+</td>
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<tr>
<td>Backup/Restore</td>
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</tr>
<tr>
<td>Restored backups</td>
<td>+</td>
</tr>
<tr>
<td>Base</td>
<td>+</td>
</tr>
<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>Menu items</td>
<td>+</td>
</tr>
<tr>
<td>Menus</td>
<td>+</td>
</tr>
</tbody>
</table>

Fig. 280: *The Change Password Link*
Fig. 281: The Change Password Form

Fig. 282: List of available Themes

Fig. 283: 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. 285: *Jumbotron and Logo options*

Fig. 286: *GeoNode Default Home*
Fig. 287: *Updating Jumbotron and Logo*

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. 288: *Hide Jumbotron text*

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: [✓] -- Hide Text: [x]>`
- `slide 2 <Enabled: [✓] -- Hide Text: [x]>`
- `slide 3 <Enabled: [✓] -- 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 background</td>
<td>Choose file</td>
</tr>
<tr>
<td>Jumbotron slide content</td>
<td># Write Markdown Here To Format Slide Content</td>
</tr>
<tr>
<td></td>
<td>This is a paragraph in a slide content</td>
</tr>
<tr>
<td>Fill in this section with markdown</td>
<td></td>
</tr>
<tr>
<td>Hides text in the jumbotron slide</td>
<td>Check this if the jumbotron background image already contains text</td>
</tr>
<tr>
<td>Is enabled</td>
<td>Disabling 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.

![Hide text in the jumbotron slide](image)

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. 289: *Adding New Users*

Fig. 290: *The Add User button in the Users List page*

Fig. 291: *Add User Link*
Fig. 292: 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. 294: *New Users Active by default*

Fig. 295: *Disabled Users*
Fig. 296: Changing Users Passwords

Fig. 297: 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.

![Staff and Superuser permissions](image)

Fig. 298: 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

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. 300: The Group Creation Form
Cartographers

Last Modified: Nov. 29, 2021, 9:56 a.m.

This group consists of GeoNode Cartographers

This group is Public (invite-only). Anyone may view this group but membership is by invitation only.

Members

admin
No Organization info

Fig. 301: The Group Details Page
Fig. 302: The Groups List Page

Fig. 303: The Groups Section on the Admin Panel
Fig. 304: A new Group Profile
Fig. 305: The Group Profiles List

Fig. 306: 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.

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

Total: 3

- **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 cillu ... 

  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. 309: *Group Profiles List Page*
Cartographers
Last Modified: Nov. 29, 2021, 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
- No Group

Members

admin
- No Organization info
- 0 followers, 2 following, 4 followers

Fig. 310: 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. 311: 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. 312: *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. 313: *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. 315: Adding a new Member to the Group

Fig. 316: 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:

![Fig. 317: From upload to publication: the review process on GeoNode](image)

**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_MODERATEUPLOADS 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.

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

[Submit]
<table>
<thead>
<tr>
<th>Metadata uploaded preserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metadata xml:</td>
</tr>
<tr>
<td>&lt;gmd:MD_Metadata xmlns:gmd=&quot;<a href="http://www.isotc211.org/2005/gmd%22/%3E">http://www.isotc211.org/2005/gmd&quot;/&gt;</a></td>
</tr>
</tbody>
</table>

**Popular count:** 2

**Share count:** 0

- **Featured**
  - Should this resource be advertised in home page?

- **Published**
  - Should this resource be published and searchable?

- **Approved**
  - Is this resource validated from a publisher or editor?
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.

Fig. 318: Admin dashboard Base Panel

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. 320: 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.
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)

**Fig. 324: Metadata editor Licenses**

**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. 325: 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.
Site administration

ACCOUNTS
- Email addresses

ACTSTREAM
- Actions
- Follows

ANNOUNCEMENTS
- Announcements
- Dismissals

AUTHENTICATION AND AUTHORIZATION
- Groups
- Avatar
- Avatars

BACKUP/RESTORE
- Restored backups

BASE
- Configuration
- Contact roles
- Curated thumbnails

Fig. 327: Announcements from the Admin panel

Fig. 328: Announcements List from the Profile panel
Create Announcement

Title

Level
General

Content

- Site wide
- Members only

Dismissal type
Session Only Dismissal

Publish_start

Publish_end

Cancel  Save

Fig. 329: Create Announcement from the Profile panel
Fig. 330: *Create Announcement from the Admin panel*

Fig. 331: *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).

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.
   
   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
   
   **Warning**: By using this approach, internationalization won’t be supported. For the time being GeoNode does not support this for menus created from the Admin > Base panel.

   - A Menu Placeholder from the existing ones.
   - A Order in the case you’ll create more menus associated to the same placeholder.
<table>
<thead>
<tr>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
</tr>
<tr>
<td>Contact roles</td>
</tr>
<tr>
<td>Curated thumbnails</td>
</tr>
<tr>
<td>Hierarchical keywords</td>
</tr>
<tr>
<td>Licenses</td>
</tr>
<tr>
<td>Links</td>
</tr>
<tr>
<td><strong>Menu items</strong></td>
</tr>
<tr>
<td><strong>Menu placeholders</strong></td>
</tr>
<tr>
<td><strong>Menus</strong></td>
</tr>
<tr>
<td>Metadata Regions</td>
</tr>
<tr>
<td>Metadata Restriction Code Types</td>
</tr>
<tr>
<td>Metadata Spatial Representation Types</td>
</tr>
<tr>
<td>Metadata Topic Categories</td>
</tr>
<tr>
<td>Thesauri</td>
</tr>
<tr>
<td>Thesaurus Keyword Labels</td>
</tr>
<tr>
<td>Thesaurus Keywords</td>
</tr>
<tr>
<td>Thesaurus Labels</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Celery Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group results</td>
</tr>
<tr>
<td>Task results</td>
</tr>
</tbody>
</table>

Fig. 333: *Menu, Menu Items and Menu Placeholder options on the Admin panel*
Fig. 334: The default `TOPBAR_MENU` Menu Placeholder on the Admin panel

Fig. 335: 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.

![Create a new Menu Item from the Admin panel](image)

**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)
Fig. 337: DJANGO/GEONODE OAUTH TOOLKIT Admin panel

- 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.:
Django OAuth Toolkit administration

Django OAuth Toolkit

Access tokens
Applications
Grants
Id tokens
Refresh tokens

Fig. 338: Add a new "Access token"

Add access token

User
Source refresh token
Token
Id token
Application
Expires
Scope

Fig. 339: Create an "Access token"
Fig. 340: Select a User

Fig. 341: Select a Token
Fig. 342: Select the GeoServer Application

Fig. 343: Select the Token Expiration

Fig. 344: Select the Application Scope
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 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 `migrate_baseurl` Management Command allows you to fix all the GeoNode Links whenever, for some reason, you need to change the Domain Name of IP Address of GeoNode.

This must be used also in the cases you’ll need to change the network schema from HTTP to HTTPS, as an instance.

First of all let’s take a look at the `--help` option of the `migrate_baseurl` management command in order to inspect all the command options and features.

```bash
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py migrate_baseurl --help
```

This will produce output that looks like the following

```
```
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

```
```

(continues on next page)
Update the GeoNode Datasets: permissions (including GeoFence database),
statistics, thumbnails

optional arguments:
- \[ \text{-h, --help} \]
  show this help message and exit
- \[ \text{--version} \]
  show program's version number and exit
- \[ \text{-v \{0,1,2,3\}, --verbosity \{0,1,2,3\}} \]
  Verbosity level; 0=minimal output, 1=normal output,
  2=verbose output, 3=very verbose output
- \[ \text{--settings \text{SETTINGS}} \]
  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.
- \[ \text{--pythonpath \text{PYTHONPATH}} \]
  A directory to add to the Python path, e.g.
  "/home/djangoprojects/myproject".
- \[ \text{--traceback} \]
  Raise on CommandError exceptions
- \[ \text{--no-color} \]
  Don't colorize the command output.
- \[ \text{-i, --ignore-errors} \]
  Stop after any errors are encountered.
- \[ \text{-d, --remove-duplicates} \]
  Remove duplicates first.
- \[ \text{-f \text{FILTER}, --filter \text{FILTER}} \]
  Only update data the Datasets that match the given
  filter.
- \[ \text{-u \text{USERNAME}, --username \text{USERNAME}} \]
  Only update data owned by the specified username.
- \[ \text{--updatepermissions} \]
  Update the Dataset permissions.
- \[ \text{--updatethumbnails} \]
  Update the Dataset styles and thumbnails.
- \[ \text{--updateattributes} \]
  Update the Dataset attributes.
- \[ \text{--updatebbox} \]
  Update the Dataset BBOX.

**Example 1:** I want to update/sync all Datasets permissions and attributes with the GeoSpatial Server

```
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

```
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] 
  [--settings SETTINGS] 
  [--pythonpath PYTHONPATH] [-d] [-i] [-f FILTER] 
  [-u USERNAME] [--updatethumbnails]

Update the GeoNode maps: permissions, thumbnails

optional arguments:
  -h, --help            show this help message and exit
  --version             show program's version number and exit
  -v {0,1,2,3}, --verbosity {0,1,2,3} 
                        Verbosity level: 0=minimal output, 1=normal output, 
                        2=verbose output, 3=very verbose output
  --settings SETTINGS   The Python path to a settings module, e.g. 
                        "myproject.settings.main". If this isn't provided, the 
                        DJANGO_SETTINGS_MODULE environment variable will be 
                        used.
  --pythonpath PYTHONPATH 
                        A directory to add to the Python path, e.g.
                        
                        
                        
                        "/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
```

(continues on next page)
-u 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

1.25. GeoNode Management Commands 575
usage: manage.py set_all_layers_metadata [-h] [--version] [-v {0,1,2,3}]  
                  [--settings SETTINGS]  
                  [--pythonpath PYTHONPATH]  
                  [--traceback] [-no-color] [-i] [-d]  
                  [-t] [-f FILTER] [-u USERNAME]

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 576
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 programmatically.
- 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

```
DJANGO_SETTINGS_MODULE=geonode.settings python manage.py importlayers --help
```

**Note:** If you enabled *local_settings.py* the command will change as following:

```
DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py importlayers --help
```

This will produce output that looks like the following:

```
usage: manage.py importlayers [-h] [-hh HOST] [-u USERNAME] [-p PASSWORD]
[---version] [-v {0,1,2,3}] [---settings SETTINGS]
[---pythonpath PYTHONPATH] [---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
```
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/`.

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.
Welcome

This GeoServer instance is running version 2.15.2. For more information please contact the administrator.

New data source

Choose the type of data source you wish to configure

Vector Data Sources

- CSV - Comma delimited text file
- Directory of spatial files (shapefiles) - Takes a directory of shapefiles and exposes it as a data store
- GeoPackage - GeoPackage
- H2 - H2 Embedded Database
- H2 (JNDI) - H2 Embedded Database (JNDI)
- Microsoft SQL Server (JNDI) - Microsoft SQL Server (JNDI)
- MySQL (JNDI) - MySQL Server (JNDI)
- PostgreSQL (JNDI) - PostgreSQL Database (JNDI)
- Properties - Allows access to Java Property files containing Feature information
- Shapefile - ESRI(tm) Shapefiles (*.shp)
- Web Feature Server (NG) - Provides access to the Features published a Web Feature Service, and the
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
   
   ```bash
   DJANGO_SETTINGS_MODULE=geonode.settings python manage.py updatelayers --help
   ```

   **Note:** If you enabled `local_settings.py` the command will change as following:

   ```bash
   DJANGO_SETTINGS_MODULE=geonode.local_settings python manage.py updatelayers --help
   ```
### GeoServer

#### Layer Preview

List of all layers configured in GeoServer and provides previews in various formats for each.

<table>
<thead>
<tr>
<th>Type</th>
<th>Title</th>
<th>Common Formats</th>
<th>All Formats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raster</td>
<td>_1_SARMIENTO_ENERO_2018</td>
<td>GeoJSON, KML, GML</td>
<td>Select one</td>
</tr>
</tbody>
</table>
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,  
                            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  
                            registered 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

FutureWarning: the .identification and .serviceidentification properties will merge into .identification being a list of properties. This is currently implemented in .identificationinfo. Please see https://github.com/geopython/OWSLib/issues/38 for more information

FutureWarning: The .keywords and .keywords2 properties will merge into the .keywords property in the future, with .keywords becoming a list of MD_Keywords instances. This is currently implemented in .keywords2. Please see https://github.com/geopython/OWSLib/issues/301 for more information

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 &lt;i&gt;&lt;a href="http://master.demo.geonode.org/people/profile/admin"&gt;admin&lt;/a&gt;&lt;/i&gt; uploaded the following Dataset:&lt;br/&gt;&lt;strong&gt;_1_SARMIENTO_ENERO_2018&lt;/strong&gt;&lt;br/&gt;
You can visit the Dataset’s detail page here: http://master.demo.geonode.org/Datasets/geonode:_1_SARMIENTO_ENERO_2018
</p>
</body>
(continues on next page)
To change how you receive notifications, please go to http://master.demo.geonode.org

To change how you receive notifications, please go to http://master.demo.geonode.org

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:

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

(continues on next page)
You have received the following notice from master.demo.geonode.org:

The user <a href="http://master.demo.geonode.org/people/profile/admin">admin</a> uploaded the following Dataset:

**_1_SARMIENTO_ENERO_2018**

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
... 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>

You have received the following notice from master.demo.geonode.org:

The following Dataset was updated:

**_1_SARMIENTO_ENERO_2018** owned by <a href="http://master.demo.geonode.org/people/profile/admin">admin</a>
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/>
&lt;strong&gt;_1_SARMIENTO_ENERO_2018&lt;/strong&gt;, owned by &lt;i&gt;&lt;a href="http://master.demo.geonode.org/people/profile/admin">admin</a&gt;&lt;/i&gt;&lt;br/&gt;
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:

Strong>_1_SARMIENTO_ENERO_2018</strong>, owned by &lt;i&gt;&lt;a href="http://master.demo.geonode.org/people/profile/admin">admin</a&gt;&lt;/i&gt;&lt;br/&gt;
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

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:
    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
5.000000 seconds per Dataset

**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.

http://services.land.vic.gov.au/landchannel/content/help?name=sampledata

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:

```
|-- ANZVI0803003025.htm
 |-- DSE_Data_Access_Licence.pdf
 |-- VMADMIN.POSTCODE_POLYGON.xml
 |-- admin_postcode_vm.zip
  |-- vicgrid94
   |-- mif
    |-- lga_polygon
     |-- macedon\ ranges
      |-- EXTRACT_POLYGON.mid
      |-- EXTRACT_POLYGON.mif
      |-- VMADMIN
```

(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:
Warning 6: Normalized/laundered field name: 'FEATURE_TYPE' to 'FEATURE_TY'
Warning 6: Normalized/laundered field name: 'FEATURE_QUALITY_ID' to 'FEATURE_QU'
Warning 6: Normalized/laundered field name: 'PFI_CREATED' to 'PFI_CREATE'
Warning 6: Normalized/laundered field name: 'UFI_CREATED' to 'UFI_CREATE'

This output indicates that some of the field names were truncated to fit into the constraint that attributes in shapefiles are only 10 characters long.

You will now have a set of files that make up the postcode_polygon.shp shapefile set. We can inspect them by issuing the following command:

```
$ ogrinfo -so postcode_polygon.shp postcode_polygon
```

The output will look similar to the output we saw above when we inspected the MapInfo file we converted from:

```
INFO: Open of `postcode_polygon.shp'
       using driver `ESRI Shapefile' successful.
Layer name: postcode_polygon
Geometry: Polygon
Feature Count: 26
Extent: (144.030296, -37.898156) - (145.101137, -36.888878)
Layer SRS WKT:
GEOGCS["GCS_WGS_1984",
       DATUM["WGS_1984",
              SPHEROID["WGS_84",6378137,298.257223563]],
       PRIMEM["Greenwich",0],
       UNIT["Degree",0.017453292519943295]]
PFI: String (10.0)
POSTCODE: String (4.0)
FEATURE_TY: String (6.0)
FEATURE_QU: String (20.0)
PFI_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 composites 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:
### gdalinfo batemans_ele

And this should be the corresponding output:

<table>
<thead>
<tr>
<th>Driver</th>
<th>AIG/Arc/Info Binary Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Files</td>
<td>batemans_ele</td>
</tr>
<tr>
<td></td>
<td>- batemans_ele/dblbnd.adf</td>
</tr>
<tr>
<td></td>
<td>- batemans_ele/hdr.adf</td>
</tr>
<tr>
<td></td>
<td>- batemans_ele/metadata.xml</td>
</tr>
<tr>
<td></td>
<td>- batemans_ele/prj.adf</td>
</tr>
<tr>
<td></td>
<td>- batemans_ele/sta.adf</td>
</tr>
<tr>
<td></td>
<td>- batemans_ele/w001001.adf</td>
</tr>
<tr>
<td></td>
<td>- batemans_ele/w001001x.adf</td>
</tr>
<tr>
<td>Size is</td>
<td>155, 142</td>
</tr>
<tr>
<td>Coordinate System is:</td>
<td></td>
</tr>
<tr>
<td>PROJCS[&quot;unnamed&quot;,</td>
<td></td>
</tr>
<tr>
<td>GEOGCS[&quot;GDA94&quot;,</td>
<td></td>
</tr>
<tr>
<td>DATUM[&quot;Geocentric_Datum_of_Australia_1994&quot;,</td>
<td></td>
</tr>
<tr>
<td>SPHEROID[&quot;GRS 1980&quot;,6378137,298.257222101,</td>
<td></td>
</tr>
<tr>
<td>AUTHORITY[&quot;EPSG&quot;,&quot;7019&quot;],</td>
<td></td>
</tr>
<tr>
<td>TOWGS84[0,0,0,0,0,0,0],</td>
<td></td>
</tr>
<tr>
<td>AUTHORITY[&quot;EPSG&quot;,&quot;6283&quot;],</td>
<td></td>
</tr>
<tr>
<td>PRIMEM[&quot;Greenwich&quot;,0,</td>
<td></td>
</tr>
<tr>
<td>AUTHORITY[&quot;EPSG&quot;,&quot;8901&quot;],</td>
<td></td>
</tr>
<tr>
<td>UNIT[&quot;degree&quot;,0.0174532925199433,</td>
<td></td>
</tr>
<tr>
<td>AUTHORITY[&quot;EPSG&quot;,&quot;4283&quot;],</td>
<td></td>
</tr>
<tr>
<td>AUTHORITY[&quot;EPSG&quot;,&quot;4283&quot;],</td>
<td></td>
</tr>
<tr>
<td>PROJECTION[&quot;Transverse_Mercator&quot;],</td>
<td></td>
</tr>
<tr>
<td>PARAMETER[&quot;latitude_of_origin&quot;,0],</td>
<td></td>
</tr>
<tr>
<td>PARAMETER[&quot;central_meridian&quot;,153],</td>
<td></td>
</tr>
<tr>
<td>PARAMETER[&quot;scale_factor&quot;,0.9996],</td>
<td></td>
</tr>
<tr>
<td>PARAMETER[&quot;false_easting&quot;,500000],</td>
<td></td>
</tr>
<tr>
<td>PARAMETER[&quot;false_northing&quot;,1000000],</td>
<td></td>
</tr>
<tr>
<td>UNIT[&quot;METERS&quot;,1]</td>
<td></td>
</tr>
<tr>
<td>Origin</td>
<td>(239681.000000000000000,6050551.0000000000000000)</td>
</tr>
<tr>
<td>Pixel Size</td>
<td>(100.000000000000000000,-100.000000000000000000)</td>
</tr>
<tr>
<td>Corner Coordinates:</td>
<td></td>
</tr>
<tr>
<td>Upper Left</td>
<td>(239681.000,6050551.000) (150d 7'28.35&quot;E, 35d39'16.56&quot;S)</td>
</tr>
<tr>
<td>Lower Left</td>
<td>(239681.000,6036351.000) (150d 7'11.78&quot;E, 35d47'11.23&quot;S)</td>
</tr>
<tr>
<td>Upper Right</td>
<td>(255181.000,6050551.000) (150d17'44.07&quot;E, 35d39'30.83&quot;S)</td>
</tr>
<tr>
<td>Lower Right</td>
<td>(255181.000,6036351.000) (150d17'28.49&quot;E, 35d47'11.23&quot;S)</td>
</tr>
<tr>
<td>Center</td>
<td>(247431.000,6043451.000) (150d12'28.17&quot;E, 35d43'13.99&quot;S)</td>
</tr>
<tr>
<td>Band 1 Block=256x4 Type=Float32, ColorInterp=Undefined</td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>-62.102 Max=142.917</td>
</tr>
<tr>
<td>NoData Value</td>
<td>-3.4028234663852886e+38</td>
</tr>
</tbody>
</table>

You will notice that the batemans_elevation.asc file does not contain projection information while the batemans_ele file does. Because of this, let’s use the batemans_ele files for this exercise and convert them to a GeoTiff for use in GeoNode. We will also reproject this file into WGS84 in the process. This can be accomplished with the following command:

```
$ gdalwarp -t_srs EPSG:4326 batemans_ele batemans_ele.tif
```

The output will show you the progress of the conversion and when it is complete, you will be left with a batemans_ele.
tif file that you can upload to your GeoNode.

You can inspect this file with the gdalinfo command:

```
gdalinfo batemans_ele.tif
```

Which will produce the following output:

```
Driver: GTiff/GeoTIFF
Files: batemans_ele.tif
Size is 174, 130
Coordinate System is:
GEOGCS["WGS 84",
    DATUM["WGS_1984",
        SPHEROID["WGS 84",6378137,298.257223563,
            AUTHORITY["EPSG","7030"],
            AUTHORITY["EPSG","6326"],
        PRIMEM["Greenwich",0],
        UNIT["degree",0.0174532925199433],
            AUTHORITY["EPSG","4326"],
    Origin = (150.119938943722502,-35.654598806259330)
    Pixel Size = (0.001011114155919,-0.001011114155919)
Metadata:
    AREA_OR_POINT=Area
Image Structure Metadata:
    INTERLEAVE=BAND
Corner Coordinates:
    Upper Left ( 150.1199389, -35.6545988) (150d 7'11.78"E, 35d39'16.56"S)
    Lower Left ( 150.1199389, -35.7860436) (150d 7'11.78"E, 35d47'9.76"S)
    Upper Right ( 150.2958728, -35.6545988) (150d17'45.14"E, 35d39'16.56"S)
    Lower Right ( 150.2958728, -35.7860436) (150d17'45.14"E, 35d47'9.76"S)
    Center ( 150.2079059, -35.7203212) (150d12'28.46"E, 35d43'13.16"S)
Band 1 Block=174x11 Type=Float32, ColorInterp=Gray
```

**Raster Data Optimization: Optimizing and serving big raster data**

(Ref: [https://geoserver.geo-solutions.it/edu/en/raster_data/advanced_gdal/example5.html](https://geoserver.geo-solutions.it/edu/en/raster_data/advanced_gdal/example5.html))

When dealing with big raster datasets it could be very useful to use tiles. Tiling allows large raster datasets to be broken-up into manageable pieces and are fundamental in defining and implementing a higher level raster I/O interface.

In this example we will use the original dataset of the `chiangMai_ortho_optimized` public raster 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_ortho.tif
```

It will produce the following results:
Driver: GTiff/GeoTIFF  
Files: chiangMai_ortho.tif  
Size is 63203, 66211  
Coordinate System is:  
PROJCS["WGS 84 / UTM zone 47N",  
  GEOGCS["WGS 84",  
    DATUM["WGS_1984",  
      SPHEROID["WGS 84",6378137.298,257223563,  
        AUTHORITY["EPSG","7030"]],  
      AUTHORITY["EPSG","6326"]],  
    PRIMEM["Greenwich",0,  
      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) ( 98d53'38.77"E, 18d36'25.19"N)  
Upper Right ( 488892.181, 2057413.890) ( 98d3'40.94"E, 18d36'27.38"N)  
Lower Right ( 488892.181, 2055593.702) ( 98d3'40.98"E, 18d35'25.22"N)  
Center ( 487980.478, 2056458.796) ( 98d5' 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.

![Tiled Image](image1.png) ![Stripped Image](image2.png)

In the tiled image we will have to decompress only 16 tiles, whereas in the stripped image on the right we’ll have to decompress many more strips.

Drone images data usually have a stripped structure so, in most cases, they need to be optimized to increase performances.

Let’s take a look at the gdal_translate command used to optimize our GeoTiff:

```bash
gdal_translate -co TILED=YES -co COMPRESS=JPEG -co PHOTOMETRIC=YCBCR --config GDAL_TIFF_INTERNAL_MASK YES -b 1 -b 2 -b 3 -mask 4
  chiangMai_ortho.tif
  chiangMai_ortho_optimized.tif
```

**Note:** For the details about the command parameters see [https://geoserver.geo-solutions.it/edu/en/raster_data/advanced_gdal/example5.html](https://geoserver.geo-solutions.it/edu/en/raster_data/advanced_gdal/example5.html)

Once the process ended, call the gdalinfo command on the resulting tif file:

```bash
gdalinfo chiangMai_ortho_optimized.tif
```

The following should be the results:

```none
Driver: GTiff/GeoTIFF
Files: chiangMai_ortho_optimized.tif
Size is 63203, 66211
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
  GEOGCS["WGS 84",
  DATUM["WGS_1984",
```
SPHEROID["WGS 84",6378137,298.257223563, AUTHORITY["EPSG","7030"],
AUTHORITY["EPSG","6326"],
PRIMEM["Greenwich",0, AUTHORITY["EPSG","8901"],
UNIT["degree",0.0174532925199433, AUTHORITY["EPSG","9122"],
AUTHORITY["EPSG","4326"],
PROJECTION["Transverse_Mercator"],
PARAMETER["latitude_of_origin",0],
PARAMETER["central_meridian",99],
PARAMETER["scale_factor",0.9996],
PARAMETER["false_easting",500000],
PARAMETER["false_northing",0],
UNIT["metre",1, AUTHORITY["EPSG","9001"],
AXIS["Easting",EAST],
AXIS["Northing",NORTH],
AUTHORITY["EPSG","32647"]]

Origin = (487068.774750000040513,2057413.889810000080615)
Pixel Size = (0.028850000000000,-0.028850000000000)
Metadata:
AREA_OR_POINT=Area
TIFFTAG_SOFTWARE=pix4dmapper
Image Structure Metadata:
COMPRESSION=YCbCr JPEG
INTERLEAVE=PIXEL
SOURCE_COLOR_SPACE=YCbCr
Corner Coordinates:
Upper Left ( 487068.775, 2057413.890) ( 98d52'38.72"E, 18d36'27.34"N)
Lower Left ( 487068.775, 2055503.702) ( 98d52'38.77"E, 18d35'25.19"N)
Upper Right ( 488892.181, 2057413.890) ( 98d53'40.94"E, 18d36'27.38"N)
Lower Right ( 488892.181, 2055503.702) ( 98d53'40.98"E, 18d35'25.22"N)
Center ( 487980.478, 2056458.796) ( 98d53' 9.85"E, 18d35'56.28"N)
Band 1 Block=256x256 Type=Byte, ColorInterp=Red
NoData Value=--10000
Mask Flags: PER_DATASET
Band 2 Block=256x256 Type=Byte, ColorInterp=Green
NoData Value=--10000
Mask Flags: PER_DATASET
Band 3 Block=256x256 Type=Byte, ColorInterp=Blue
NoData Value=--10000
Mask Flags: PER_DATASET

Our GeoTiff is now tiled with 256x256 tiles, has 3 bands and a 1-bit mask for nodata.

We can also add internal overviews to the file using the gdaladdo command:

gdaladdo -r average chiangMai_ortho_optimized.tif 2 4 8 16 32 64 128 256 512

Overviews are duplicate versions of your original data, but resampled to a lower resolution, they can also be compressed with various algorithms, much in the same way as the original dataset.

By default, overviews take the same compression type and transparency masks of the input dataset (applied through

1.25. GeoNode Management Commands
the gdal_translate command), so the parameters to be specified are:

- \texttt{-r average}: computes the average of all non-NODATA contributing pixels
- \texttt{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:

```bash
$ gdalinfo chiangMai_ortho_optimized.tif
```

It results in:

```
Driver: GTiff/GeoTIFF
Files: chiangMai_ortho_optimized.tif
Size is 63203, 66211
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
    GEOGCS["WGS 84",
        DATUM["WGS_1984",
            SPHEROID["WGS 84",6378137,298.257223563,
                AUTHORITY["EPSG","7030"],
                AUTHORITY["EPSG","6326"]],
            PRIMEM["Greenwich",0,
                AUTHORITY["EPSG","8901"]],
            UNIT["degree",0.0174532925199433,
                AUTHORITY["EPSG","9122"]],
                AUTHORITY["EPSG","4326"]],
            PROJECTION["Transverse_Mercator"],
            PARAMETER["latitude_of_origin",0],
            PARAMETER["central_meridian",99],
            PARAMETER["scale_factor",0.9996],
            PARAMETER["false_easting",500000],
            PARAMETER["false_northing",0],
            UNIT["metre",1,
                AUTHORITY["EPSG","9001"]],
            AXIS["Easting",EAST],
            AXIS["Northing",NORTH],
            AUTHORITY["EPSG","32647"]]
    Origin = (487068.775, 2057413.89)
    Pixel Size = (0.0288500000000000, -0.0288500000000000)
Metadata:
AREA_OR_POINT=Area
TIFFTAG_SOFTWARE=pix4dmapper
Image Structure Metadata:
COMPRESSION=YCbCr JPEG
INTERLEAVE=PIXEL
SOURCE_COLOR_SPACE=YCbCr
Corner Coordinates:
Upper Left ( 487068.775, 2057413.890) ( 98d52'38.72"E, 18d36'27.34"N)
Lower Left ( 487068.775, 2055503.702) ( 98d52'38.77"E, 18d35'25.19"N)
Upper Right ( 488892.181, 2057413.890) ( 98d53'40.94"E, 18d36'27.38"N)
Lower Right ( 488892.181, 2055503.702) ( 98d53'40.98"E, 18d35'25.22"N)
Center ( 487980.478, 2056458.796) ( 98d53' 9.85"E, 18d35'56.28"N)
Band 1 Block=256x256 Type=Byte, ColorInterp=Red
```

(continues on next page)
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"]],
                   PRIMEM["Greenwich",0,
                           AUTHORITY["EPSG","8901"]],
                   UNIT["degree",0.0174532925199433,
                        AUTHORITY["EPSG","9122"]],
```

(continues on next page)
AUTHORITY["EPSG","4326"],
PROJECTON["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:

```
gdal_translate -co TILED=YES -co COMPRESS=DEFLATE chiangMai_dtm.tif chiangMai_dtm_optimized.tif
```

When the data to compress consists of imagery (es. aerial photographs, true-color satellite images, or colored maps) you can use lossy algorithms such as JPEG. We are now compressing data where the precision is important, the band data type is Float32 and elevation values should not be altered, so a lossy algorithm such as JPEG is not suitable. JPEG should generally only be used with Byte data (8 bit per channel) so we have chosen the lossless DEFLATE compression through the COMPRESS=DEFLATE creation option.

Calling the gdalinfo command again:

```
gdalinfo chiangMai_dtm_optimized.tif
```

We can observe the following results:

```
Driver: GTiff/GeoTIFF
Files: chiangMai_dtm_optimized.tif
Size is 12638, 13240
Coordinate System is:
PROJCS["WGS 84 / UTM zone 47N",
(continues on next page)
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

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:

1.25. GeoNode Management Commands
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 *.tif*; do
echo gdal_translate -co TILED=YES -co "COMPRESS=JPEG -co PHOTOMETRIC=YCBCR -b 1 -b 2 -b 3" $filename ${filename//.tif/.optimized.tif}; done > gdal_translate.sh
chmod +x gdal_translate.sh
./gdal_translate.sh
```

3. process_rgb_alpha.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" output/$filename; done > rename.sh
chmod +x *.sh
./gdaladdo.sh
./rename.sh
```
4. process_rgb_palette.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
```

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](image)

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>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Account</strong></td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Account deletions</td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Accounts</td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Signup codes</td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td><strong>Actstream</strong></td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Actions</td>
<td>![Add] ![Change]</td>
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<tr>
<td>Follows</td>
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<tr>
<td><strong>Announcements</strong></td>
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<tr>
<td>Announcements</td>
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<tr>
<td>Dismissals</td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td><strong>Auth</strong></td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Groups</td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Users</td>
<td>![Add] ![Change]</td>
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<tr>
<td><strong>Avatar</strong></td>
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<tr>
<td>Avatars</td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Contact roles</td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Links</td>
<td>![Add] ![Change]</td>
</tr>
<tr>
<td>Metadata Regions</td>
<td>![Add] ![Change]</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.

   ![Image of Django Admin Interface](image)

   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.

   ![Image of Add User Form](image)

   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).

   ![Image of GeoNode Website](image)

   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:

```
usage: manage.py delete_resources [-h] [-c CONFIG_PATH]
     [-l LAYER_FILTERS [LAYER_FILTERS ...]]
     [-m MAP_FILTERS [MAP_FILTERS ...]]
     [-d DOCUMENT_FILTERS [DOCUMENT_FILTERS ...]]
     [--version] [-v {0,1,2,3}]
     [--settings SETTINGS]
     [--pythonpath PYTHONPATH] [--traceback]
     [--no-color] [--force-color]
```
Delete resources meeting a certain condition

optional arguments:
- `--help` show this help message and exit
- `--config CONFIG_PATH` Configuration file path. Default is: delete_resources.json
- `--layer_filters LAYER_FILTERS [LAYER_FILTERS ...]`
- `--map_filters MAP_FILTERS [MAP_FILTERS ...]`
- `--document_filters DOCUMENT_FILTERS [DOCUMENT_FILTERS ...]`
- `--version` show program's version number and exit
- `--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`)
     ```bash
     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
     ```bash
     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
     ```bash
     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's 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": ["*"],
        "document": []
    }
}
```

CLI

The CLI configuration can be specified with -l -d -m list arguments, which in fact are a translation of the configuration JSON file. -l -d -m arguments are evaluated in the same manner as filters.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")" -d "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:

```
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”.

![Fig. 345: Management command admin section](image)


![Fig. 346: Add management command job](image)

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 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.
Job status

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:

```
  "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:

```bash
curl --location --request PATCH 'http://<your_geonode_host>/api/v2/management/jobs/8/
˓→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:

```bash
curl --location --request PATCH 'http://<your_geonode_host>/api/v2/management/jobs/8/
˓→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:

```bash
curl --location --request GET 'http://<your_geonode_host>/api/v2/management/jobs/8/
˓→status/' --header 'Authorization: Basic YWRtaW46YWRtaW4='
```

Response:

```json
{
   "id": 8,
   "command": "ping_mngmt_commands_http",
   ...
}
```

(continues on next page)
"app_name": "geonode.management_commands_http",
"user": 1000,
"status": "FINISHED",
"created_at": "2021-10-08T18:17:25.045752Z",
"start_time": "2021-10-08T18:20:02.761475Z",
"end_time": "2021-10-08T18:20:32.802007Z",
"args": [
    "--sleep",
    30
],
"kwargs": {},
"celery_result_id": "fe7359a6-5f8c-47bf-859a-84351b5ed80c",
"output_message": "Sleeping for 30.0 seconds...
pong",
"celery_task_meta": {
    "date_done": "2021-10-08T18:20:32.810649Z",
    "status": "SUCCESS",
    "traceback": null,
    "worker": "worker1@4f641ffa9c0b"
}

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": "2021-10-08T18:17:25.045752Z"
        }
    ]
}

Note: This list can be filtered by the fields "celery_result_id", "command", "app_name", "status", "user" and "user__username".
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:

```python
LANGUAGE_CODE = 'fr'
```

Unfortunately Django overrides this setting, giving the language setting of a user’s browser priority. For example, if `LANGUAGE_CODE` is set to French, but the user has configured their operating system for Spanish they may see the Spanish version when they first visit GeoNode.

1.26.3 Additional Steps

If this is not the desired behaviour, and all users should initially see the default `LANGUAGE_CODE`, regardless of their browser’s settings, do the following steps to ensure Django ignores the browser language settings. (Users can always use the pulldown language menu to change the language at any time.)

As root create a new directory within GeoNode’s site packages

```bash
mkdir /usr/lib/python2.7/dist-packages/setmydefaultlanguage
```

or

```bash
mkdir /var/lib/geonode/lib/python2.7/site-packages/setmydefaultlanguage
```

if GeoNode has been installed using `apt-get`.

As root create and edit a new file /usr/lib/python2.7/dist-packages/setmydefaultlanguage/__init__.py and add the following lines

```python
class ForceDefaultLanguageMiddleware(object):
    """
    Ignore Accept-Language HTTP headers

    This will force the I18N machinery to always choose settings.LANGUAGE_CODE
    as the default initial language, unless another one is set via sessions or cookies
    """
```

(continues on next page)
Should be installed *before* any middleware that checks request.META['HTTP_ACCEPT_LANGUAGE'],
    namely django.middleware.locale.LocaleMiddleware

def process_request(self, request):
    if request.META.has_key('HTTP_ACCEPT_LANGUAGE'):
        del request.META['HTTP_ACCEPT_LANGUAGE']

At the end of the GeoNode configuration file /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 = column-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):

```
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:

```
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",
    "time": "false",
    "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 asycronously.

```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 until 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:

After clicking on it, a simple form for the upload will be shown which will allow you to select your desired RDF file:

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:

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:

```
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:

```
```

and then issue the command:

```
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 Thesaurus 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.
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:
Fig. 352: 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:

```
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:

```
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)
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/geonode/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

```
$ 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 --html,txt,py -d docs
django-admin makemessages --no-location -l en -d djangojs --js -d docs -d node_modules -d 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 it’s corresponding less file. Further this folder should never be deleted!

geonode/static/lib

The ./lib folder contains all the third-party files. This folder can be deleted as it will be fully generated by use of grunt development|production

Example 1 – Change styling:

1. In your settings set 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/
Returns a list of available endpoints
Status Codes
• 200 OK – A json with a list of available endpoints

GET /api/v2/documents/
API endpoint that return all the documents available with detailed information (paginated).

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/documents/
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 –

DELETE /api/v2/documents/
Either delete a single or many model instances in bulk, by sending a json with the ID of the document to delete
DELETE /dogs/ {
    “dogs”: [ {“id”: 1}, {“id”: 2}
    ]
}
DELETE /dogs/[
  {"id": 1}, {"id": 2}
]

Status Codes
  • 204 No Content – No response body

GET /api/v2/documents/{id}/
API endpoint that return detailed information of a specific document.

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/

```json
[{'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

```json
{ '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** –

**DELETE /api/v2/documents/{id}/**

Delete a single document.

**Parameters**

- **id** (integer) – A unique integer value identifying this document.

**Status Codes**

- **204 No Content** – No response body

**GET /api/v2/documents/{id}/linked_resources/**

API endpoint that return all the linked resources of a specific id.

**Parameters**

- **id** (integer) – A unique integer value identifying this document.

**Status Codes**

- **200 OK** –

**GET /api/v2/geoapps/**

API endpoint that show all the geoapps available.

**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 –**

**DELETE /api/v2/geoapps/**

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/geoapps/{id}/
API endpoint that show details of a specific geoapp.

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, pro-
vided 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

• **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** –

**DELETE /api/v2/geoapps/{id}/**

Delete a single instances

DELETE /dogs/ {
    “dogs”: [ {“id”: 1}, {“id”: 2} ]
}

DELETE /dogs/ [
    {“id”: 1}, {“id”: 2}
]

Parameters

• **id** *(integer)* – A unique integer value identifying this geo app.

Status Codes

• **204 No Content** – No response body

**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 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 geo app.

Status Codes

• **200 OK** –
GET /api/v2/groups/
API endpoint that return all groups available with detailed information (paginated).

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/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/ {
    “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 return detailed information of a specific group.

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, pro-
vided 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 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.

Status Codes
• 200 OK –

DELETE /api/v2/groups/{id}/
Delete a single instance

Parameters
• id (integer) – A unique integer value identifying this group profile.

Status Codes
• 204 No Content – No response body

GET /api/v2/groups/{id}/managers/
API endpoint that show the managers for the selected group.

Parameters
• id (integer) – A unique integer value identifying this group profile.

Status Codes
• 200 OK –

GET /api/v2/groups/{id}/members/
API endpoint that show either members and managers for the selected group.

Parameters
• id (integer) – A unique integer value identifying this group profile.

Status Codes
• 200 OK –

GET /api/v2/groups/{id}/resources/
API endpoint that show all the resources connected to the selected group.
Parameters

- **id (integer)** – A unique integer value identifying this group profile.

Status Codes

- 200 OK –

GET /api/v2/datasets/

API endpoint that return all the datasets available with detailed information (paginated).

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/datasets/

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/datasets/

API endpoint that allows datasets to be viewed or edited.

Status Codes
• 200 OK –

**DELETE /api/v2/datasets/**

Either delete a single or many model instances in bulk

```json
DELETE /dogs/ {
  "dogs": [{"id": 1}, {"id": 2}]
}
```

DELETE /dogs/

```json
{"id": 1}, {"id": 2}
```

**Status Codes**

• 204 No Content – No response body

**GET /api/v2/datasets/{id}/**

API endpoint that return detailed information of a specific dataset

**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:

```
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 dataset.

Status Codes

- **200 OK** –

 PATCH /api/v2/datasets/{id}/

API endpoint that allows datasets to be viewed or edited.

Parameters

- **id (integer)** – A unique integer value identifying this dataset.

Status Codes

- **200 OK** –

 DELETE /api/v2/datasets/{id}/

Delete a single model instance

```
DELETE /dogs/ {
  "dogs": [ {"id": 1}, {"id": 2} }
}
```

```
DELETE /dogs/ {
  {"id": 1}, {"id": 2}
}
```

Parameters

- **id (integer)** – A unique integer value identifying this dataset.

Status Codes

- **204 No Content** – No response body
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}/maps/
API endpoint allowing to retrieve a list of the maps using a dataset.

Parameters
- **id** (integer) – A unique integer value identifying this map.

Status Codes
- 200 OK –

GET /api/v2/datasets/{id}/maplayers/
API endpoint allowing to retrieve a list of the MapLayers related to the dataset

Parameters
- **id** (integer) – A unique integer value identifying this map.

Status Codes
- 200 OK –

GET /api/v2/maps/
API endpoint that return all the maps available with detailed information (paginated).

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/
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/ {
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/maps/
API endpoint that allows maps to be viewed or edited.

Status Codes
- 200 OK –

DELETE /api/v2/maps/
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/maps/{id}/
API endpoint that return detailed information of a specific map.

Parameters
- id (integer) – A unique integer value identifying this map.

Status Codes
- 200 OK –
PUT /api/v2/maps/{id}/
Update one or more model instances.

If ENABLE_BULK_UPDATE is set, multiple previously-fetched records may be updated in a single call, pro-
vided 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 map.

**Status Codes**

- **200 OK** –
PATCH /api/v2/maps/{id}/
API endpoint that allows maps to be viewed or edited.

Parameters

• \textit{id} (integer) – A unique integer value identifying this map.

Status Codes

• 200 OK –

DELETE /api/v2/maps/{id}/
Delete a single instance.

Parameters

• \textit{id} (integer) – A unique integer value identifying this map.

Status Codes

• 204 No Content – No response body

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

• \textit{field_name} (string) –
• \textit{id} (integer) – A unique integer value identifying this map.

Status Codes

• 200 OK –

GET /api/v2/maps/{id}/maplayers/
Return the list of the maplayers that compose the map.

Parameters

• \textit{id} (integer) – A unique integer value identifying this map.

Status Codes

• 200 OK –

GET /api/v2/maps/{id}/datasets/
API endpoint allowing to retrieve a detailed list of the local Datasets a map is using.

Parameters

• \textit{id} (integer) – A unique integer value identifying this map.

Status Codes

• 200 OK –

GET /api/v2/resources/
API endpoint that show all resources available in GeoNode, includes maps, datasets, geoapps and documents (paginated).
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:

```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** –

**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 return detailed information of a specific resource, including keywords, owner and bbox_polygon.

**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:

```bash
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}/
Delete a single instance

Parameters
• **id** (integer) – A unique integer value identifying this resource base.

Status Codes
• **204 No Content** – No response body

GET /api/v2/resources/{id}/get_perms/
API endpoint that show all the permissions defined for a specific resource, splitted by groups and users.

Parameters
• **id** (integer) – A unique integer value identifying this resource base.

Status Codes
• **200 OK** –

PUT /api/v2/resources/{id}/set_perms/
API endpoint that allows the user to set the permissions to a specific resource.

Parameters
• **id** (integer) – A unique integer value identifying this resource base.

Status Codes
• **200 OK** –

GET /api/v2/resources/approved/
Will return a list of approved resource available.
Status Codes

- **200 OK** –

**GET** /api/v2/resources/featured/
Will return a list of featured resource available.

Status Codes

- **200 OK** –

**GET** /api/v2/resources/published/
Will return a list of published resource available.

Status Codes

- **200 OK** –

**GET** /api/v2/resources/resource_types/
Will return a list of the resource types that are managed by GeoNode.

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/uploads/
List of the upload instances with their status.

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/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/ {
```
POST /dogs/ {
    "dog": {
        "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/uploads/

API endpoint that allows uploads to be viewed or edited.

Status Codes

• 200 OK –

DELETE /api/v2/uploads/

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/uploads/{id}/

Authenticated API endpoint that will show details about the upload status. Main informations available are:

• ID: upload id
• name: dataset name
• date: start date of the import process
• state: the actual state of the import process. When the state is PROCESSED, means that the dataset has been process by GeoNode and Geoserver
- progress: % of progress
- uploadfile_set: list of the uploaded files
- delete url: url to be called for delete the import
- import_url: to monitoring the import status in geoserver.

**Example of still in progress import:**

```json
{
    "upload": {
    }
}
```

**Parameters**

- `id` *(integer)* – A unique integer value identifying this upload.

**Status Codes**

- **200 OK** –

**PUT /api/v2/uploads/{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 upload.

Status Codes
- **200 OK** –

PATCH /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** –

DELETE /api/v2/uploads/{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 upload.

Status Codes
- **204 No Content** – No response body

1.35. API Schema
**GET /api/v2/uploads/{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 upload.

**Status Codes**
- **200 OK** –

**PUT /api/v2/uploads/upload/**
API endpoint that allows user to upload new datasets into GeoNode. The endpoint is protected via authentication and the request should always come from the same session. The API accept the request with form-data. Is also possible to define some information via json. Behind the scene, geonode will:

- Create an upload session
- Save the dataset into GeoNode
- Call async geoserver to save the dataset

**Example:**
```python
client = requests.session() response = client.put(
    auth=HTTPBasicAuth(username, password),
    data=params,
    files=files,
)
```

Where:
```python
params = {
    "permissions": {
        "users": [{"AnonymousUser": [{"view_resourcebase": null}],
        "groups":[]}, # dataset permissions
        "time": "false",
        "layer_title": "layer_title",
        "time": "false",
        "charset": "UTF-8",
    }
}
```
```python
files = {
    "filename": <_io.BufferedReader name="filename">
}
```

**Status Codes**
- **201 Created** –

**PUT /upload/final?id={import_id}**
API endpoint that allows user to check the status of new datasets into GeoNode. The endpoint is protected via authentication and the request should always come from the same session.

**Example:**
```python
client = requests.session() response = client.get("http://localhost:8000/upload/final?id=1")
```

Where:
```python
params = {
    "permissions": {
        "users": [{"AnonymousUser": [{"view_resourcebase": null}],
        "groups":[]}, # dataset permissions
        "time": "false",
        "layer_title": "layer_title",
        "time": "false",
        "charset": "UTF-8",
    }
}
```
Status Codes

- **200 OK**
  
  ```json
  {  
    "status": "finished",  
    "id": 131,  
    "url": "file_name_path",  
    "bbox": "-180.0000000,-90.0000000,180.0000000,90.0000000",  
    "crs": {  
      "type": "name",  
      "properties": "EPSG:4326"  
    },  
    "success": true
  }
  ```

**GET /api/v2/users/**

API endpoint that show the list of users registered in GeoNode. If the logged user is the administrator will show all the user available, otherwise only the information of his own account are provided.

**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/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**
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 return detailed information of a specific user.

**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

- **id (integer)** – A unique integer value identifying this user.

Status Codes

- **200 OK** –

DELETE /api/v2/users/{id}/
Delete a model instance.

DELETE /dogs/ {
    “dogs”: [ {“id”: 1}, {“id”: 2} 
    ]
}

DELETE /dogs/ [
    {“id”: 1}, {“id”: 2} 
]

Parameters

- **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 that show the list of the groups that the user belong to.

Parameters

- **id (integer)** – A unique integer value identifying this user.

Status Codes

- **200 OK** –

GET /api/v2/users/{id}/resources/
API endpoint that show the list of the resources that belong to the user.
Parameters

- **id** *(integer)* – A unique integer value identifying this user.

Status Codes

- **200 OK** –

GET /mapstore/rest/resources/

Only Authenticate User perform CRUD Operations on Respective Data

Status Codes

- **200 OK** – No response body

POST /mapstore/rest/resources/

Only Authenticate User perform CRUD Operations on Respective Data

Status Codes

- **201 Created** – No response body

GET /mapstore/rest/resources/{id}/

Only Authenticate User perform CRUD Operations on Respective Data

Parameters

- **id** *(integer)* – A unique value identifying this map store resource.

Status Codes

- **200 OK** – No response body

PUT /mapstore/rest/resources/{id}/

Only Authenticate User perform CRUD Operations on Respective Data

Parameters

- **id** *(integer)* – A unique value identifying this map store resource.

Status Codes

- **200 OK** – No response body

PATCH /mapstore/rest/resources/{id}/

Only Authenticate User perform CRUD Operations on Respective Data

Parameters

- **id** *(integer)* – A unique value identifying this map store resource.

Status Codes

- **200 OK** – No response body

DELETE /mapstore/rest/resources/{id}/

Only Authenticate User perform CRUD Operations on Respective Data

Parameters

- **id** *(integer)* – A unique value identifying this map store resource.

Status Codes

- **204 No Content** – No response body

GET /mapstore/rest/users/

API endpoint that show the users available with some details.
Status Codes

- 200 OK –

POST /mapstore/rest/users/
API endpoint that allows users to be viewed or edited.

Status Codes

- 201 Created –

GET /mapstore/rest/users/{id}/
API endpoint that show the users available with some details.

Parameters

- id (integer) – A unique integer value identifying this user.

Status Codes

- 200 OK –

PUT /mapstore/rest/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 –

DELETE /mapstore/rest/users/{id}/
API endpoint that allows users to be viewed or edited.

Parameters

- id (integer) – A unique integer value identifying this user.

Status Codes

- 204 No Content – No response body

GET /o/userinfo/
View used to show Claims about the authenticated End-User

Status Codes

- 200 OK – No response body

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 0.0.0.0:5432: bind: address already in use
ERROR: Encountered errors while bringing up the project.
```

Running the geonode application in debug mode:

```bash
docker exec -it django4geonode bash -c "python manage.py runserver 0.0.0.0:8000"
```

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:

```bash
docker exec -it django4geonode bash -c "pip install debugpy -t /tmp && python /tmp/debugpy --wait-for-client --listen 0.0.0.0:5678 manage.py runserver 0.0.0.0:8000 --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#`.

1.36. How to Develop
• To run your application, you can use the integrated terminal (`./manage.py runserver 0.0.0.0:8000`) 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

```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service apache2 stop</td>
<td>Stop GeoNode service</td>
</tr>
<tr>
<td>service tomcat7 stop</td>
<td>Stop GeoNode service</td>
</tr>
</tbody>
</table>
```

**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:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service apache2 stop</td>
<td>Stop GeoNode service</td>
</tr>
<tr>
<td>service tomcat7 stop</td>
<td>Stop GeoNode service</td>
</tr>
</tbody>
</table>

#### 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**

```bash
$ 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**

```bash
$ 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**

```bash
$ sudo pip install virtualenvwrapper
```

Install postgresql and postgis

**Warning:** Those instructions might be outdated. Please refer to **3. Postgis database Setup**

```bash
$ sudo apt-get install postgresql-10 postgresql-10-postgis-2.4
```

Change postgres password expiry and set a password

```bash
$ sudo passwd -u postgres  # change password expiry infromation
$ sudo passwd postgres  # change unix password for postgis
```

Create geonode role and database

```bash
$ su postgres
$ createdb geonode_dev
$ createdb geonode_dev-imports
$ psql
$ postgres=#
$ postgres=# CREATE USER geonode_dev WITH PASSWORD 'geonode_dev'; # should be same as _password in setting.py
$ postgres=# GRANT ALL PRIVILEGES ON DATABASE "geonode_dev" to geonode_dev;
$ postgres=# GRANT ALL PRIVILEGES ON DATABASE "geonode_dev-imports" to geonode_dev;
$ postgres=# \
$ psql -d geonode_dev-imports -c 'CREATE EXTENSION postgis;'
```

(continues on next page)
$ psql -d geonode_dev-imports -c 'GRANT ALL ON geometry_columns TO PUBLIC;'
$ psql -d geonode_dev-imports -c 'GRANT ALL ON spatial_ref_sys TO PUBLIC;'
$ exit

Edit PostgreSQL configuration file

```bash
sudo gedit /etc/postgresql/10/main/pg_hba.conf
```

Scroll to the bottom of the file and edit this line

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

To be as follows

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

Then restart PostgreSQL to make the changes effective

```bash
sudo service postgresql restart
```

Java dependencies

```bash
$ sudo apt-get install -y openjdk-11-jdk --no-install-recommends
```

Install supporting tools

```bash
$ sudo apt-get install -y ant maven git gettext
```

3. Setup Python virtual environment (Here is where Geonode will be running)

Add the virtualenvwrapper to your new environment.

Since we are using Ubuntu, you can add the following settings to your .bashrc file. Please note that the Ubuntu account here is called “geonode”. So you will need to change it according to the name you picked.

```bash
$ echo export VIRTUALENVWRAPPER_PYTHON=/usr/bin/python >> ~/.bashrc
$ echo export WORKON_HOME=/home/geonode/dev/.venvs >> ~/.bashrc
$ echo source /usr/local/bin/virtualenvwrapper.sh >> ~/.bashrc
$ echo export PIP_DOWNLOAD_CACHE=$HOME/.pip-downloads >> ~/.bashrc
```

And reload the settings by running

```bash
$ source ~/.bashrc
```

Set up the local virtual environment for Geonode

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

```bash
$ source /usr/share/virtualenvwrapper/virtualenvwrapper.sh
$ mkvirtualenv --python=/usr/bin/python3 geonode
$ workon geonode # or $ source /home/geonode/dev/.venvs/geonode/bin/activate
```

(continues on next page)
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:

```bash
$ 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:

```bash
$ git clone https://github.com/GeoNode/geonode.git -b 3.2.x
```

Install Nodejs PPA and other tools required for static development:

This is required for static development:

```bash
$ sudo apt-get install nodejs npm
$ cd geonode/geonode/static
$ npm install --save-dev
```

Note: Every time you want to update the static files after making changes to the sources, go to geonode/static and run ‘grunt production’.

Warning: Starting from the following step, you have to make sure that you installed GDAL correctly according to the documentation page “Install GDAL for Development”

Install GeoNode in the new active local virtualenv:

```bash
$ cd /home/geonode/dev  # or to the directory containing your cloned GeoNode
$ pip install -e geonode
$ cd geonode/geonode
```

Create local_settings.py:

Copy the sample file /home/geonode/dev/geonode/geonode/local_settings.py.geoserver.sample and rename it to be local_settings.py:

```bash
$ cd /home/geonode/dev/geonode
$ cp geonode/local_settings.py.geoserver.sample geonode/local_settings.py
$ gedit geonode/local_settings.py
```

In the local_settings.py file, add the following line after the import statements:
```
SITEURL = "http://localhost:8000/"

In the DATABASES dictionary under the 'default' key, change only the values for the keys NAME, USER and PASSWORD to be as follows:
```
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.postgresql_psycopg2',
        'NAME': 'geonode_dev',
        'USER': 'geonode_dev',
        'PASSWORD': 'geonode_dev',
        .......
    }
}

In the DATABASES dictionary under the 'datastore' key, change only the values for the keys NAME, USER and PASSWORD to be as follows:
```
# vector datastore for uploads
'datastore': {
    'ENGINE': 'django.contrib.gis.db.backends.postgis',
    'NAME': 'geonode_dev-imports',
    'USER': 'geonode_dev',
    'PASSWORD': 'geonode_dev',
    .......
}
```

In the CATALOGUE dictionary under the 'default' key, uncomment the USER and PASSWORD keys to activate the credentials for GeoNetwork as follows:
```
CATALOGUE = {
    'default': {
        # The underlying CSW implementation
        # default is pycsw in local mode (tied directly to GeoNode Django DB)
        'ENGINE': 'geonode.catalogue.backends.pycsw_local',
        # pycsw in non-local mode
        # 'ENGINE': 'geonode.catalogue.backends.pycsw_http',
        # GeoNetwork opensource
        # 'ENGINE': 'geonode.catalogue.backends.geonetwork',
        # deegree and others
        # 'ENGINE': 'geonode.catalogue.backends.generic',
        # The FULLY QUALIFIED base url to the CSW instance for this GeoNode
        'URL': urljoin(SITEURL, '/catalogue/csw'),
        # URL: 'http://localhost:8080/geonetwork/srv/en/csw',
        # URL: 'http://localhost:8080/deegree-csw-demo-3.0.4/services',
    }
}
```

(continues on next page)
5- Install and Start Geoserver

From the virtual environment, first you need to align the database structure using the following command:

```
$ cd /home/geonode/dev/geonode
$ python manage.py migrate
```

**Warning:** If the start fails because of an import error related to osgeo or libgeos, then please consult the Install GDAL for Development

then setup GeoServer using the following command:

```
$ paver setup
$ paver sync
```

6- Now we can start our geonode instance

**Warning:** Don’t forget to stop the GeoNode Production services if enabled

```
service apache2 stop
service tomcat7 stop
```

```
$ paver start
```

The starting process will take around 20 seconds (depends on your machine) and at the end it shows the following message:
Now you can visit the geonode site by typing http://0.0.0.0:8000 into your browser window.
Install GeoNode-Project for development after installing GeoNode-Core

GeoNode-Project gives the user flexibility to customize the installation of the GeoNode. GeoNode itself will be installed as a requirement of your project. Inside the project structure it is possible to extend, replace or modify all geoNode components (e.g. css and other static files, templates, models..) and even register new django apps without touching the original GeoNode code. In order to install GeoNode-Project, the following steps need to be executed alongside the previous GeoNode-Core installation steps.

1- Use django-admin.py to create a project “my_geonode” from a GeoNode-Project template as follows:

```
$ django-admin.py startproject my_geonode --template=https://github.com/GeoNode/geonode-project/archive/master.zip -e py,rst,json,yml,ini,env,sample -n Dockerfile
```

```
ls /home/geonode/dev  # should output: geonode  my_geonode
```

**Note:** Before running the following command, make sure that you are currently working on the virtual environment and just outside geonode directory. The command will create a new project called “my_geonode” which should be located at the level of geonode-core installation directory “inside /home/geonode/dev”

Although the following command might show that the majority of requirements are already satisfied “because GeoNode-Core was already installed”, it is recommended to still execute it as it might update or install any missing
2- Install all the required packages/tools for GeoNode-Project as follows:

```bash
$ pip install -e my_geonode
```

**Note:** As mentioned earlier, GeoNode will be installed as requirement for the GeoNode-Project in order to be able to extend it

### Install GeoNode-Project directly from scratch

If you didn’t install GeoNode-Core earlier and you wanted to install GeoNode-Project directly, please follow these steps

1- Create a virtual environment as follows:

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

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

Alternatively you can also create the virtual env like below

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

2- Clone the geonode-project repo from Github

```bash
$ git clone https://github.com/GeoNode/geonode-project.git -b 3.2.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
8- Visit http://localhost:8000/

### 1.36.3 How to run GeoNode Core for development

In order to start GeoNode Core for development, you need to make sure that no GeoNode instance is running first. This can be done by running the following commands:

```
$ cd /home/user/geonode
$ paver stop_geoserver
$ paver stop_django
```

Then you need to start both geoserver and django services as follows:

```
$ paver start_geoserver
$ paver start_django
```

Now you can visit your GeoNode GUI by typing http://localhost:8000 into your browser window.

### 1.36.4 How to run GeoNode Project for development

In order to run a project for development, the following steps have to be followed:

1. Make sure there is no running instance of GeoNode first by running the following command:

```
$ cd /home/user/my_geonode
$ paver stop
```

The above command will stop all services related to GeoNode if running

2. Start the servers by running paver start as follows:

```
$ paver start
```

Now you can visit your geonode project site by typing http://localhost:8000 into your browser window.
1.36.5 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

```
sudo apt install nodejs npm
```

Prepare the source code

```
git clone --recursive https://github.com/GeoNode/geonode-mapstore-client.git geonode-mapstore-client-dev
```

Compile MapStore2 Client

```
cd geonode-mapstore-client/geonode_mapstore_client/client/
npm update
npm install
npm run compile
```

Edit the file env.json

```
vim env.json
```

```
{
   "DEV_SERVER_HOST": "localhost:8000",
   "DEV_SERVER_HOST_PROTOCOL": "http"
}
```

Run MapStore2 in Development mode

```
npm run start
```

Connect to ::http://localhost:8081

This is a proxied version of GeoNode form MapStore2 client. To upload new layers user the original GeoNode. Everytime you render a map, from GeoNode layers details page or map creation, you will access to the MapStore2 dev mode running code.

You can now update the code on the fly.
Example 1: Disable the PrintPlugin from the Layer Details small map

```javascript
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
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:

```
$ django-admin.py startproject my_geonode --template=https://github.com/GeoNode/geonode-project/archive/master.zip -e py,rst,json,yml,ini,env,sample -n Dockerfile
```

Here, django-admin is used with startproject option to create my_geonode project copying the template which is passed as GeoNode-project Github repo. It also includes “py,rst,json,yml,ini,env,sample” extensions

2- Once the cloning finished, the next step is to install the GeoNode-Project we just downloaded as follows:

```
$ pip install -e my_geonode
```

3- Install geoserver using paver as follows

```
$ cd /home/geonode/my_geonode
$ paver setup
```

4- Note the GeoNode database connection parameters mentioned in the local_settings.py configuration file. If not found, copy local_settings.py.sample and rename it to local_settings.py then use psql to create the required user and grant the required privileges as follows:

```
$ su postgres
$ createdb geonode
$ psql

postgres=# CREATE USER geonode WITH PASSWORD 'geonode';
CREATE ROLE
postgres=# GRANT ALL PRIVILEGES ON DATABASE "geonode" to geonode;
GRANT
postgres=# \q
```

**Warning:** Don’t forget to exit from postgres user before executing the following commands

5- Run GeoNode using paver

```
$ cd /home/geonode/my_geonode
$ paver start
```

**Note:** You may find this warning message: You have 132 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): account, actstream, admin, agregon_ratings, announcements, auth, avatar, base, contenttypes, dialogs, documents, favorite, geonode_client, geonode_themes, groups, guardian, invitations, layers, maps, mapstore2_adapter, monitoring, oauth2_provider, people, pinax_notifications, services, sessions, sites, socialaccount, taggit, tastypie, upload, user_messages. Run ‘python manage.py migrate’ to apply them.

Which means you have some sql statements not executed yet and you need to run the “migrate” to sync your database first then “paver start” again as follows:
$ python manage.py migrate
$ paver start

**Warning:** If encountered this message: (Invalid HTTP_HOST header: '0.0.0.0:8000'). You may need to add u'0.0.0.0' to ALLOWED_HOSTS) It can be fixed in the settings.py file. You will need to add: ALLOWED_HOSTS = ['0.0.0.0'] in settings.py

6- Once the previous step is done, you can visit 0.0.0.0:8000 to view the GUI of GeoNode. However, we still don’t have an account in order to login from the GUI. This can be done using “paver sync”. The command will create sync with latest fixtures and also creates a superuser “admin” with default password “admin”

7- Use the created account to login from the GUI through localhost:8000 or 0.0.0.0:8000
2- Customize the look and feel

In this section we will change the look and feel of GeoNode, in particular we will do some customization to help understanding how the template inheritance works and how to add new stuff to your GeoNode. The changes will include the home page, the top menu, the footer and a generic GeoNode page.

Homepage:
The geonode-project provides some predefined templates to change the home page and the general site content. In the “my_geonode/my_geonode/templates” directory we can edit the site_index.html. Try to edit the content of the “jumbotron” box in the page, save and refresh your browser to see the changes.

The theme:
To change the theme of our geonode-project we can act on the site_base.css file available in the “my_geonode/my_geonode/static/css” folder.

The file is empty so we can inspect elements of the home page with the browser’s developer tools and define css rules in there.

For example, if we want to change the background of the jumbotron, in this file we can add

```
.home .jumbotron { background: red }
```

Then once we refreshed the browser, we should see the change as follows:

Adding the " .home " class is necessary in order to let the rule have precedence/priority over the GeoNode’s one. We can see this by inspecting the element in the developer console.

**The top menu:**

Now we can make some changes that will apply to the whole site. We can add a Geocollections entry in the top menu bar.

Edit the site_base.html file in the templates folder and uncomment the list item adapting the text as well from:

```html
{% comment %}
Add Tab for Third Party Apps
<li>
 <a href="{{ PROJECT_ROOT }}/app">App</a>
</li>
{% endcomment %}
```

To:

```html
<li>
 <a href="{{ PROJECT_ROOT }}/geocollections">Geocollections</a>
</li>
```

On browser refresh you will see a new entry in the nav bar which is persistent to the whole site.
GeoNode generic page

As you can see in the templates folder there are only the site_index.html and the site_base.html files. In order to customize another GeoNode page, for example the layers list page, you need to recreate the same folder structure of the GeoNode templates folder and add a file with the same name.

For the layers list page we can create a directory named “layers” inside the template directory and a file named “layer_list.html” inside layers. The changes made in this file will only affect the layer list page.

```
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
```

(continues on next page)
```python
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
```

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 manage.py makemigrations
# the above command informs you with the migrations to be executed on the database
python manage.py migrate
```

Next we will use django generic view to show the collections detail. Add the following code in the views.py file:

```
from django.views.generic import DetailView
from .models import Geocollection

class GeocollectionDetail(DetailView):
    model = Geocollection
```

Add url configuration

In order to access the created view we also need url mapping. We can create a urls.py file containing a url mapping to our generic view:

```
from django.conf.urls import url
from .views import GeocollectionDetail

urlpatterns = [  
    url(r'^(?P<slug>[-\w]+)/$',  
        GeocollectionDetail.as_view(),  
        name='geocollection-detail'),
]
```

We also need to register the app urls in the project urls. So let’s modify the “my_geonode” urls.py file adding the following:

```
...  
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:

```
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> 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 authoriza-
tion).
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.
class Meta:
    permissions = (
        ('view_geocollection', 'Can view geocollection'),
    )

Then run “python manage.py makemigrations” and “python manage.py migrate” to install them.

Permissions logic (set_default)

Let’s add a method that will be used to set the default permissions on the Geocollections. We can add this logic to the Geocollection model but could also be a generic Mix-in similar to how it is implemented in GeoNode.

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.

def set_permissions(self, perm_spec):
    anonymous_group = Group.objects.get(name='anonymous')
    self.remove_object_permissions()

    if 'users' in perm_spec and "AnonymousUser" in perm_spec['users']:
        assign_perm('view_geocollection', anonymous_group, self)

    if 'users' in perm_spec:
        for user, perms in perm_spec['users'].items():
            user = get_user_model().objects.get(username=user)
            assign_perm('view_geocollection', user, self)
if 'groups' in perm_spec:
    for group, perms in perm_spec['groups'].items():
        group = Group.objects.get(name=group)
        assign_perm('view_geocollection', group, self)

def remove_object_permissions(self):
    from guardian.models import UserObjectPermission, GroupObjectPermission
    UserObjectPermission.objects.filter(content_type=ContentType.objects.get_for_model(self),
                                          object_pk=self.id).delete()
    GroupObjectPermission.objects.filter(content_type=ContentType.objects.get_for_model(self),
                                          object_pk=self.id).delete()

Permissions logic (views.py)

We can add now a view to receive and set our permissions, in views.py:

```python
vim geocollections/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 :(
```

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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
from tastypie.resources import ModelResource
from tastypie import fields
from tastypie.constants import ALL_WITH_RELATIONS, ALL

from geonode.api.api import ProfileResource, GroupResource
from geonode.api.resourcebase_api import ResourceBaseResource

from .models import Geocollection
class GeocollectionResource(ModelResource):
    users = fields.ToManyField(ProfileResource, attribute=lambda bundle: bundle.obj.get_group().group.user_set.all(), full=True)
    group = fields.ToOneField(GroupResource, 'group', full=True)
    resources = fields.ToManyField(ResourceBaseResource, 'resources', full=True)

class Meta:
    queryset = Geocollection.objects.all().order_by('-group')
    ordering = ['group']
    allowed_methods = ['get']
    resource_name = 'geocollections'
    filtering = {
        'group': ALL_WITH_RELATIONS,
        'id': ALL
    }

API authorization
We want the API to respect our custom permissions, we can easily achieve this by adding the following to the beginning of api.py:

```python
from tastycollection.authorization import DjangoAuthorization
from guardian.shortcuts import get_objects_for_user

class GeocollectionAuth(DjangoAuthorization):
    def read_list(self, object_list, bundle):
        permitted_ids = get_objects_for_user(
            bundle.request.user,
            'geocollections.view_geocollection').values('id')
        return object_list.filter(id__in=permitted_ids)

    def read_detail(self, object_list, bundle):
        return bundle.request.user.has_perm('view_geocollection', bundle.obj)
```

And this to the GeocollectionResource Meta class:

```python
authorization = GeocollectionAuth()
```
Add a url for our API

In order to publish our API we need a url and we want that url to appear under the GeoNode’s /api domain.

The final url for our API has to be /api/geocollections.

We can inject the url into the GeoNode API by adding the following lines to “my_geonode/urls.py” file:

```
from geonode.api.urls import api
from geocollections.api import GeocollectionResource
api.register(GeocollectionResource())
```

And add the following in the urlpatterns:

```
url(r'', include(api.urls)),
```

The final result will be:

```
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:

```
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

```xml
<Directory "/path/to/my_geonode/">
  Order allow,deny
  Require all granted
</Directory>
```

• Test your server.

This documentation helps developers to install GeoNode-Core and GeoNode-Project from different scenarios. GeoNode-Project can be installed on top of GeoNode-Core if already installed. Also GeoNode-Project can be installed from scratch as it has GeoNode-Core as a prerequisite.
HTTP ROUTING TABLE

/api
GET /api/v2/, 642
GET /api/v2/datasets/, 652
GET /api/v2/datasets/{id}/, 653
GET /api/v2/datasets/{id}/maplayers/, 655
GET /api/v2/datasets/{id}/maps/, 655
GET /api/v2/datasets/{id}/{field_name}/, 654
GET /api/v2/documents/, 643
GET /api/v2/documents/{id}/, 644
GET /api/v2/documents/{id}/linked_resources/, 645
GET /api/v2/maps/, 655
GET /api/v2/maps/{id}/, 656
GET /api/v2/maps/{id}/datasets/, 658
GET /api/v2/maps/{id}/maplayers/, 658
GET /api/v2/maps/{id}/{field_name}/, 658
GET /api/v2/resources/, 658
GET /api/v2/resources/approved/, 661
GET /api/v2/resources/featured/, 662
GET /api/v2/resources/published/, 662
GET /api/v2/resources/resource_types/, 662
GET /api/v2/resources/{id}/, 660
GET /api/v2/resources/{id}/get_perms/, 661
GET /api/v2/schema/, 662
GET /api/v2/uploads/, 662
GET /api/v2/uploads/{id}/, 663
GET /api/v2/uploads/{id}/{field_name}/, 665
GET /api/v2/users/, 667
GET /api/v2/users/{id}/, 668
GET /api/v2/users/{id}/groups/, 669
GET /api/v2/users/{id}/resources/, 669
POST /api/v2/datasets/, 652
POST /api/v2/documents/, 643
POST /api/v2/geopoints/, 646
POST /api/v2/groups/, 649
POST /api/v2/maps/, 655
POST /api/v2/resources/, 659
POST /api/v2/uploads/, 662
POST /api/v2/users/, 667
PUT /api/v2/datasets/{id}/, 653
PUT /api/v2/documents/{id}/, 644
PUT /api/v2/geopoints/{id}/, 647
PUT /api/v2/groups/{id}/, 650
PUT /api/v2/maps/{id}/, 656
PUT /api/v2/resources/{id}/, 660
PUT /api/v2/resources/{id}/set_perms/, 661
PUT /api/v2/uploads/upload/, 666
PUT /api/v2/uploads/{id}/, 664
PUT /api/v2/users/{id}/, 668
DELETE /api/v2/datasets/, 653
DELETE /api/v2/datasets/{id}/, 654
DELETE /api/v2/documents/, 643
DELETE /api/v2/documents/{id}/, 645
DELETE /api/v2/geopoints/, 646
DELETE /api/v2/geopoints/{id}/, 648
DELETE /api/v2/groups/, 649
DELETE /api/v2/groups/{id}/, 651
DELETE /api/v2/maps/, 656
DELETE /api/v2/maps/{id}/, 657
DELETE /api/v2/resources/, 659
DELETE /api/v2/resources/{id}/, 661
DELETE /api/v2/uploads/, 663
DELETE /api/v2/uploads/{id}/, 665
DELETE /api/v2/users/, 667
DELETE /api/v2/users/{id}/, 669
PATCH /api/v2/datasets/, 652
PATCH /api/v2/datasets/{id}/, 654
PATCH /api/v2/documents/{id}/, 645
PATCH /api/v2/geopoints/, 646
PATCH /api/v2/geopoints/{id}/, 648
PATCH /api/v2/groups/, 649
PATCH /api/v2/groups/{id}/, 651
PATCH /api/v2/maps/, 656
PATCH /api/v2/maps/{id}/, 657
PATCH /api/v2/resources/, 659
PATCH /api/v2/resources/{id}/, 661
PATCH /api/v2/uploads/, 663
PATCH /api/v2/uploads/{id}/, 665

/mapstore
GET /mapstore/rest/resources/, 670
GET /mapstore/rest/resources/{id}/, 670
GET /mapstore/rest/users/, 670
GET /mapstore/rest/users/{id}/, 671
POST /mapstore/rest/resources/, 670
POST /mapstore/rest/users/, 671
PUT /mapstore/rest/resources/{id}/, 670
PUT /mapstore/rest/users/{id}/, 671
DELETE /mapstore/rest/resources/{id}/, 670
DELETE /mapstore/rest/users/{id}/, 671
PATCH /mapstore/rest/resources/{id}/, 670

/o
GET /o/userinfo/, 671

/upload
PUT /upload/final?id={import_id}, 666