# User Manual

## Real-time Geospatial Data Processor and Visualiser

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COEUS

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v0.2

# Contents

# Document History

| Version | Date | Changed By | Summary |
|---|---|---|---|
| v0.1 | 29 July 2016 | Nsovo Baloyi<br>Maluleki Nyuswa<br>Keletso Molefe<br>Kamogelo Tswene | First Draft |
| v0.2 | 09 September 2016 | Nsovo Baloyi<br>Maluleki Nyuswa<br>Keletso Molefe<br>Kamogelo Tswene | Second Draft |

# 1 Introduction

The Geospatial Data Processor and Visualizer is, as the name suggests, a geopspatial data processor and visualizer. It is a service used to visualize disaster and weather data in real-time. The weather center shows 3-hourly temperature, humidity, wind and precipitation data, while the disaster center shows earthquakes, floods, drought and fire data.

The Geospatial Data Processor and Visualizer can help you in three ways:

- It can show you active disasters, which you may track and alert people of impending danger.
- It alerts the user of any newly active disasters which you can again track.
- It shows weekly weather forecasts which you may analyse to plan for your week.

The Geopsatial Data Processor and Visualizer is developed under Linux, but is set-up to be highly portable using Docker container. As a result, it runs on most operating systems that have support for Docker.
This manual is divided into two parts, each of which is divided into several sections.

*The first part forms a user manual:*

This part will focus on the functionality of the website from the general users perspective.

- **Page Navigation Section**
  shows you how to navigate around the website.
- **Features**
  will explain the features of the website in detail. This includes logging in, registering and making queries etc.

*The second part provides information for developers:*

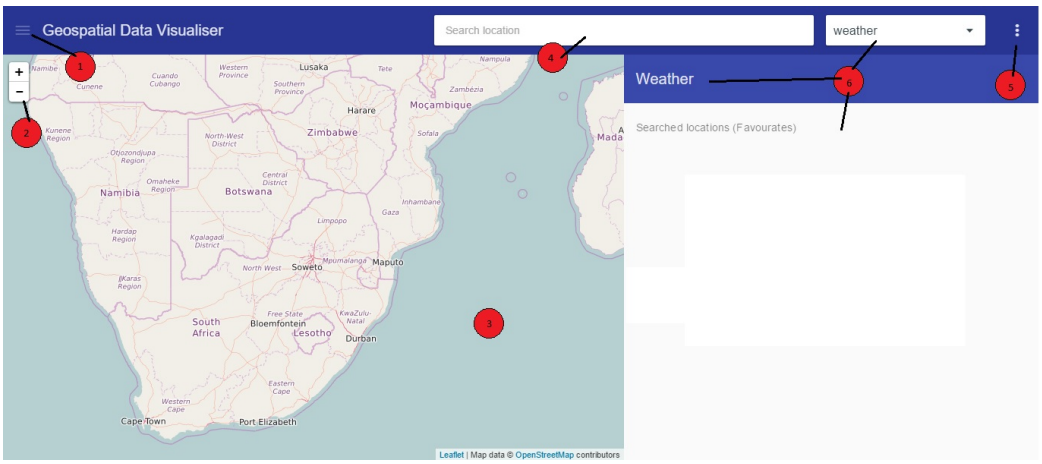
This part will focus on setting up the servers and overall configuration from the developers perspective. It also supplies information on testing and deployment.

- **Installation Section**
  discusses how to download, compile, install and configure the service on your platform.
- **Code Maintenance Section**
  describes the file structure and how you can maintain the code to add features.
- **Troubleshooting Section**
  discusses how to fix issues that may arise while setting up.

# 2 Part1: Using the website

## 2.1 Website Navigation

When you first land on the site you will land on the page shown below. The purpose of this section is to describe what each of the labelled functions are used for.




1. **Menu**
2. **Zoom Button** : With the zoom button feature, one may zoom, the map area, in and out. The ”-” button is used for the function of zooming the map area out, and the ”+” button is used for the function of zooming the map area in.
3. **Map Area** : Display the map

4. **Search Area** : Used to search for any location in the world

5. **User menu** : The user menu is used to log the user in and out as well as check the settings.

6. **Center Navigation** : The Dropdown area is used to choose which functionality, of the site, you'd like to use. When loaded, the site lands on the weather center by default.

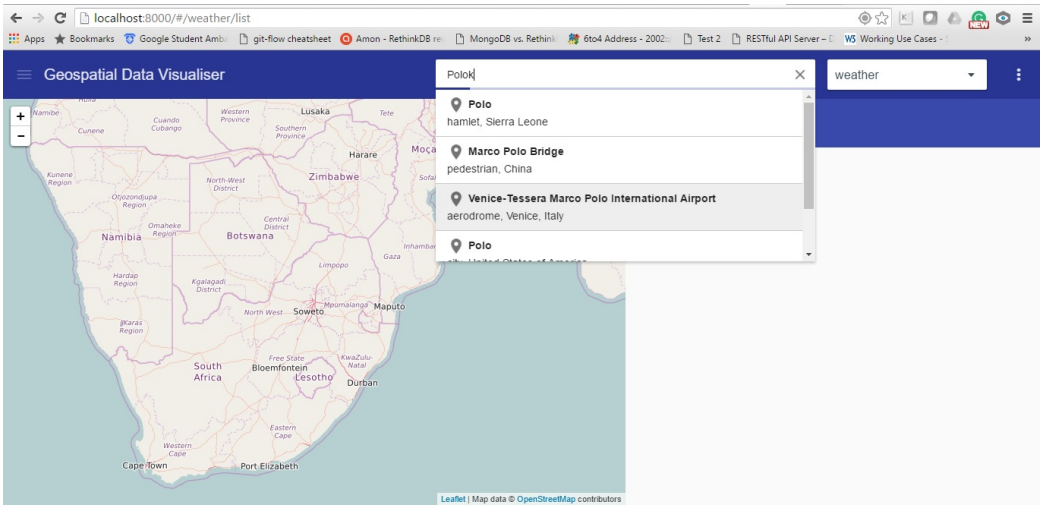
## 2.2 Features

### 2.2.1 Login

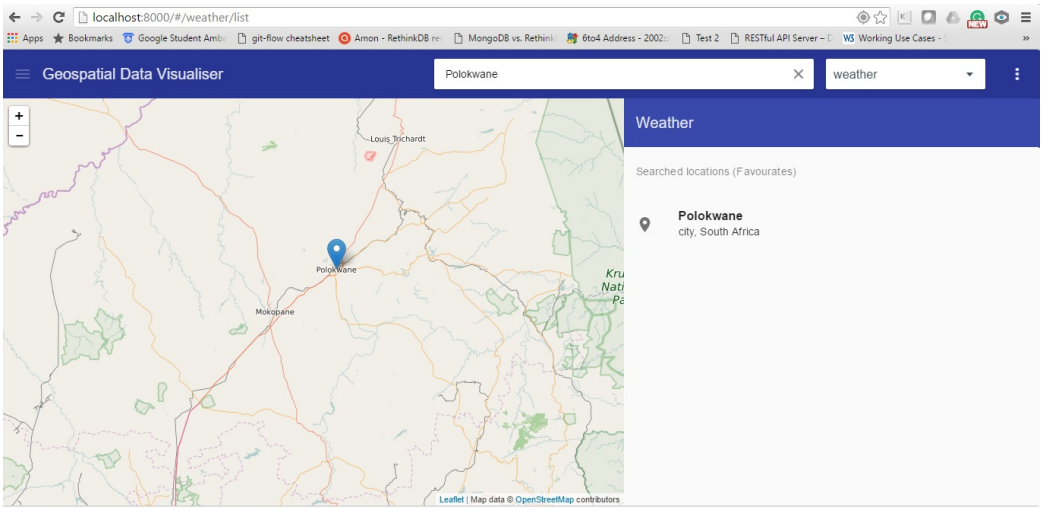
### 2.2.2 Registration

### 2.2.3 Location Search

The search service, is used to search and load any place in the world. As shown in the figure below, you need to click in the search box and start typing the name of the place you are searching for.



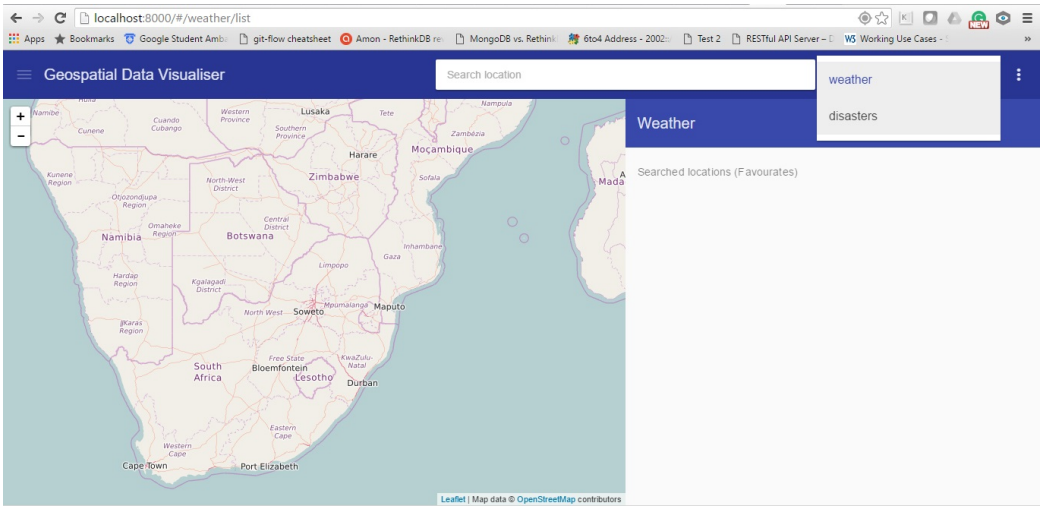

While searching a possible list of places will be loaded in a dropdown list as shown in the figure above. Once you have found the place you are looking for, use your mouse to point to the name of the place and click on that name, which will then activate a process of reloading the map to the place you have selected, like the figure shown below. A marker will be placed to show the location you queried.




The search feature is also linked to other functions of the site. When the weather center is currently active, the location name will be added to the listed of locations you have already searched for as shown above. These features will be explained in more detail in sections about the respective features.

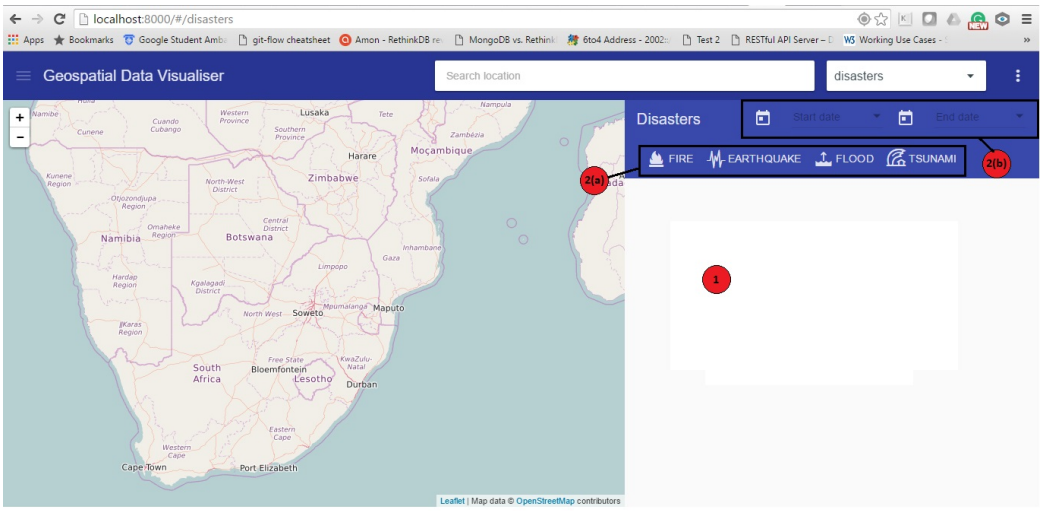
### 2.2.4 Disaster Center

To navigate to the disaster center. Click on the "Center navigation" and move you mouse cursor over the "disasters" button on the dropdown list and click. Shown in the the figure below.

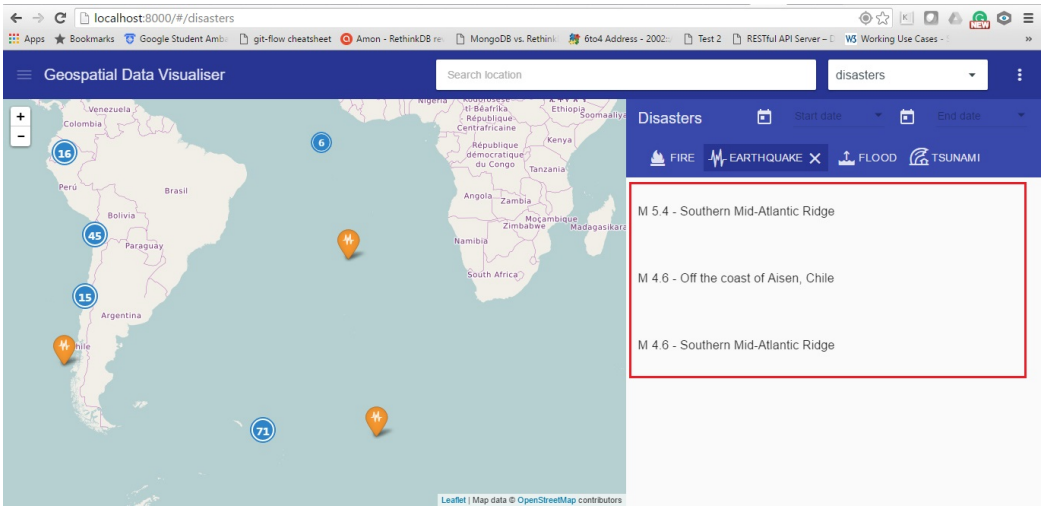



Once you have loaded the disaster center, you will land on the page shown

in the figure below below. The numbers on the figure show the features currently available in the disaster center.




1. **List of disasters** : This part of the center will show the list of disasters that are currently displayed on the map area. It will allow the user to load more information about each disaster displayed on the map area. For example, if a user decides to show earthquakes as shown in the figure below. The earthquakes or any disaster for that matter will be loaded on to the map area. The blue icons show a number of disasters clustered in a specific range of area the blue icon lays over. Each individual disaster then has its own type of icon. Earthquakes shown by yellow icons, fires by red etc. As you may see from the figure below, only the individual disasters are shown on the list.



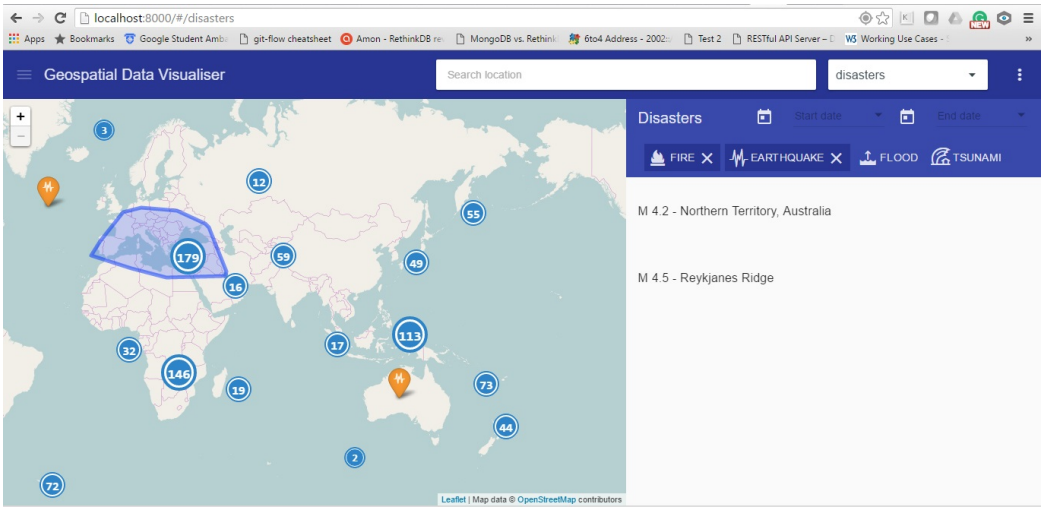

By moving the map to another location you then refresh the list by loading the disaster currently visible on the map area.

2. **Query Features** This section describes how the query features may be used.

   (a) **Query by Type**: This feature allows you to query disasters by type. You may click on one or more of the buttons on the query panel, which will then perform a query and load the selected disasters on the map area. When clicked the system then performs a query for the type queried and displays it on the map. This will then reload the button in the "clicked" state. By clicking it again you the perform another query to remove the disaster you clicked on from the map area.

   (b) **Query by Time**: This feature, like the the type query, will perform a query to load disasters which happen on the specified date. This allows the user to load disasters from a specified date in the past to the current date of the day the query is perform. This feature goes hand in hand with the type query, therefore if no disaster is picked, no disaster will be loaded on the map area even after picking a date.

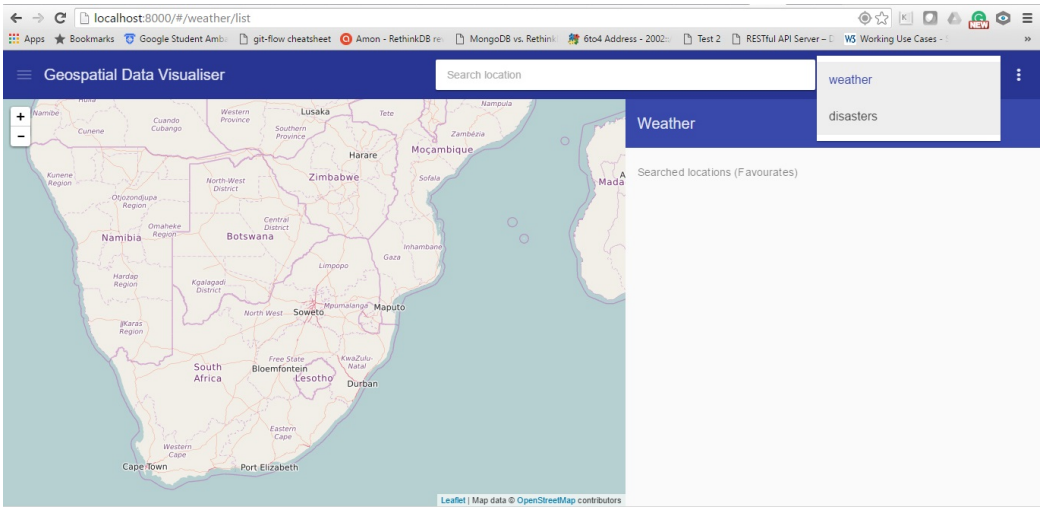
   As stated above, once a query is performed, the disasters are loaded onto the map area. The blue icons show the number of disasters clustered in a range that is projected by the blue section that appears when you hover over one of the blue icons as shown in the figure below.




When you click one of these blue icons, the system perform a zoom service to the location of that icon. This then reveals more blue icons or disasters hidden by the clustering feature. By clicking another blue icon another zoom service is performed again etc.

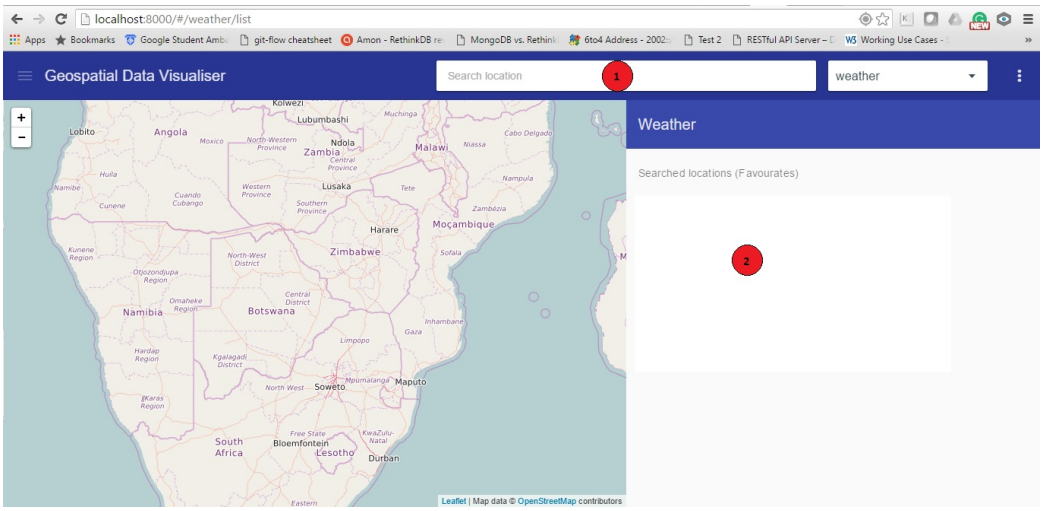
### 2.2.5 Weather Center

Like the Disaster center to navigate to the disaster center. Click on the "Center navigation" and move you mouse cursor over the "weather" button on the dropdown list and click. Shown in the the figure below.



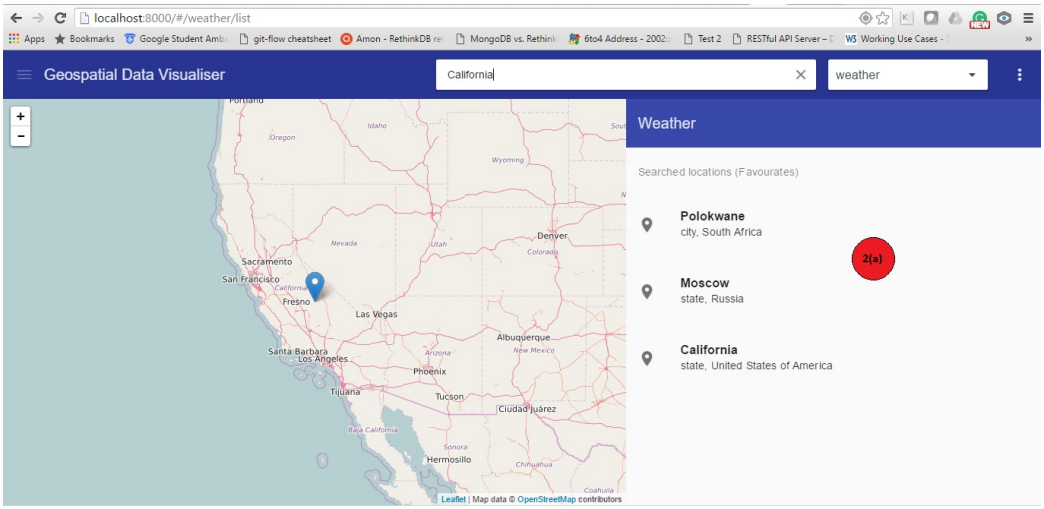

Once you have loaded the weather center, you will land on the page shown

in the figure below below. The numbers on the figure show the features currently available in the disaster center.



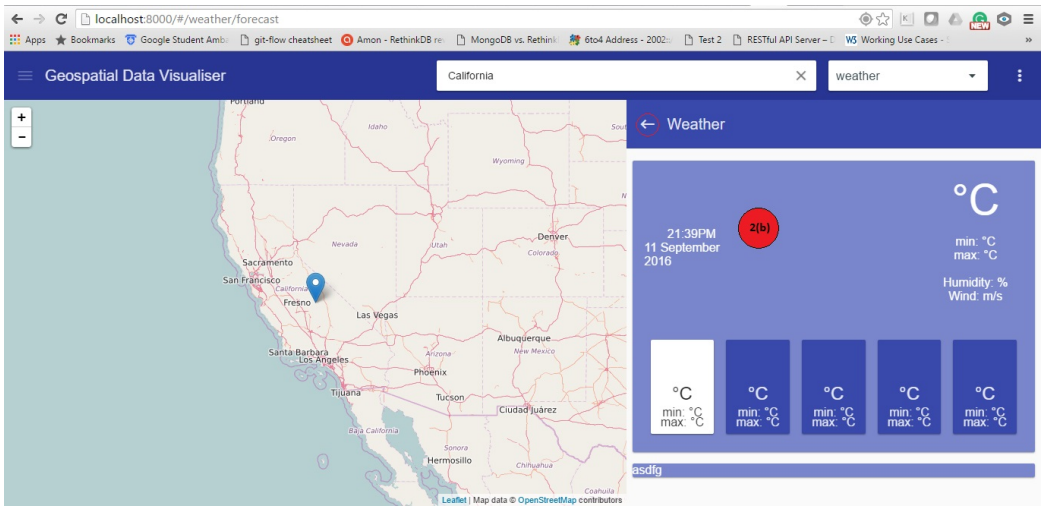

1. **Search** : The search feature works hand in hand with the weather center. You are required to first search for a location by using the search feature as explained in 2.2.3

2. **Weather List** Once you have search for a location it is added to locations on the weather list section as show in the figure below.



(a) **List of locations**: The figure above shows the locations loaded after searching. To load the current weather of a location on the list. You need to use your mouse and hover over on of the items on the list and click.

(b) **Selected location**: Once a location is selected from the list of locations, more details about that locations weather is loaded as show in the figure below. To navigate back to the list of locations, you must click the back button as shown by the red circle in the figure below.




### 2.2.6 Map Features

The features that are listed below will be are part of the map service provided by the system, these include:

1. **Zoom feature**
2. **On map area click feature**
3. **On map click and drag**

# 3 Part2: Setting up

## 3.1 Installation

This section will cover the configuration of the various servers on your platform.

### 3.1.1 Minimum Software Requirements

To run the service you are required to have git, NodeJS v6 or higher (Which comes with npm v3 or higher), RabbitMQ, MongoDB and RethinkDB installed on your platform.

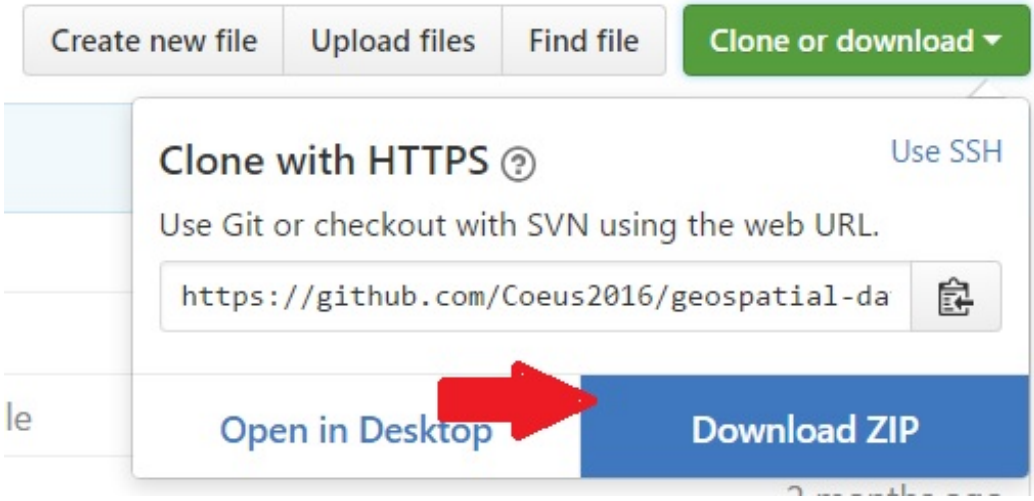
### 3.1.2 Configuration

1. **Download Source Code**
   The source code is located on Github at the : https://github.com/Coeus2016/geospatial-data-processor-and-visualizer. You are required to clone the repository. There are two ways to clone the repository:

   - By using the git command line. In the root folder run the following commands

     ```
     $git clone https://github.com/Coeus2016/geospatial-data-processor-and-visualizer.git
     ```

   - By downloading the a *zip file from this url https://github.com/Coeus2016/geospatial-data-processor-and-visualizer



2. **Installing Required Modules**
   Now that you have downloaded the repository, navigate to the root folder and perform the following commands.

   ```
   $git submodule update --init --recursive
   $npm install
   ```

   These commands updated the submodules and install the node modules required to run the server

### 3.1.3 Starting The Service

Once you have downloaded and installed all required modules, you are ready to start the service. The following steps need to be followed to insure a safe start of the system.

1. Before you can start the application server, you need to make sure all other used services (RethinkDB, MongoDB, RabbitMQ) have been started[1].

2. Once the other services have been started, running the following command will start the application.

   ```
   $npm start
   ```

   The backend Server will run on port 3200, the scrapper on port 3500 and the webserver on port 3000. To view the website, simply visit http://localhost:3000 on your browser.

[1] A lot of the time they are configured to start when the computer is booted otherwise you are required to start the services manually in different terminal windows.

## 3.2 Code Maintenance

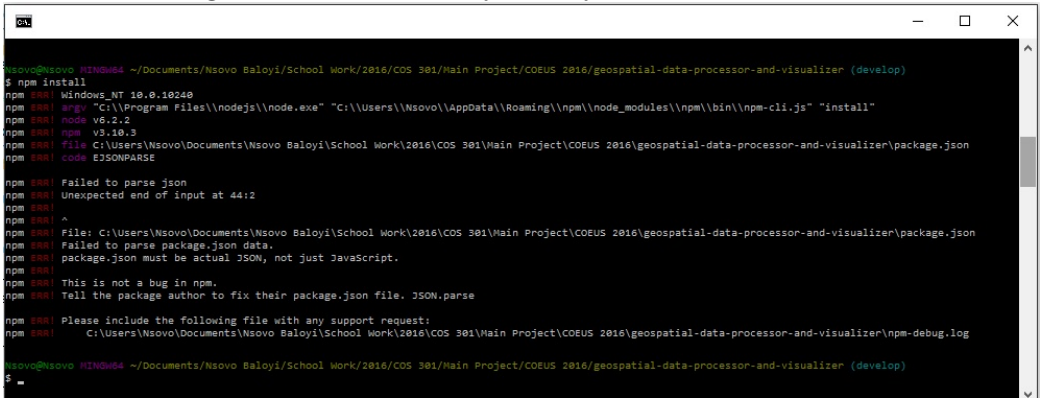
### 3.2.1 Overview of File Structure


- **visualizer-scrapper**
- **visualizer-server**
- **web-interface**

## 3.3 Troubleshooting

### 3.3.1 Installation

While installing the node modules you may run into a window such as this:




This is a common issue and requires you to run the installation script again

```
$npm install
```

# 4 References