Geoinformatics Group
http://geolab.gis.land/

Перспективы Web GIS: возможности работы с геоданными в Интернет-браузере

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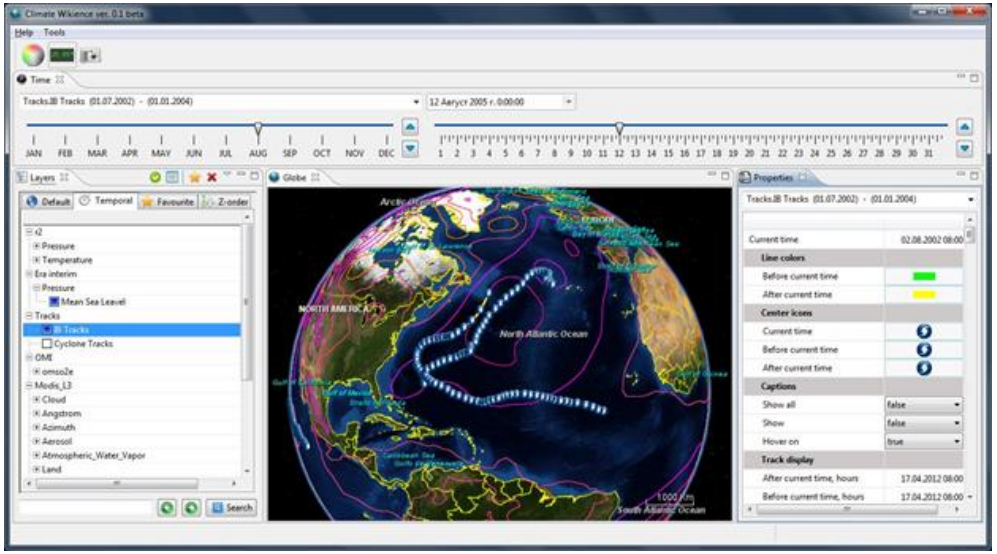
Содержание

Определение GIS

Geographic Information System - приложение для работы с геопространственными данными

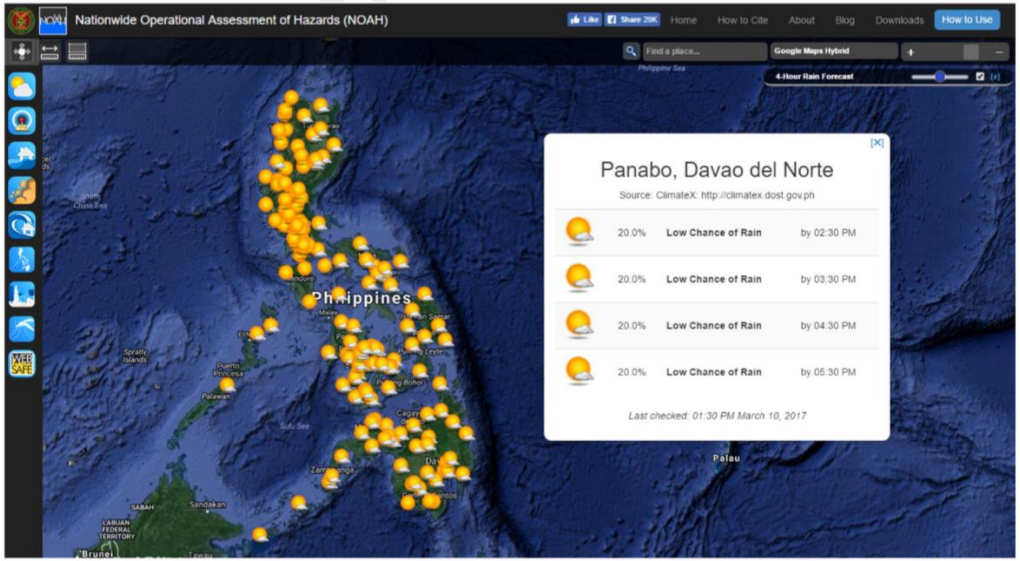
- Представление слоёв на карте
- Модификация слоёв
- Инструменты анализа



http://www.wikience.org/ru/

Применение GIS

- Прогноз погоды
- Информация о пробках
- Навигация
- Мониторинг экологии
- Предупреждение о катаклизмах
- Анализ атмосферы и почвы



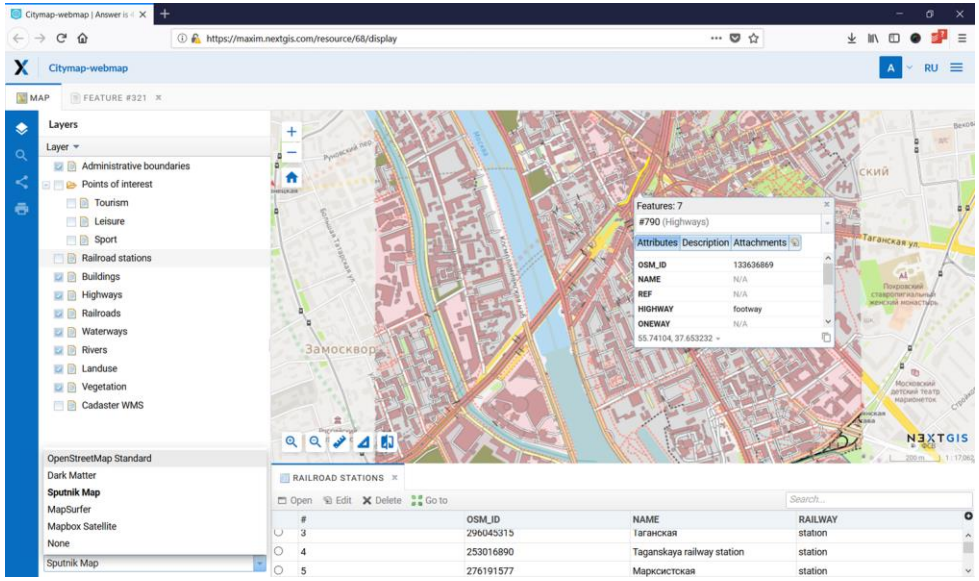
Lagmay A. M. F. A. Disseminating near-real-time hazards information and flood maps in the Philippines through Web-GIS / A. M. F. A. Lagmay, B. A. Racoma, K. A. Aracan, J. Alconis-Ayco, I. L. Saddi // Journal of Environmental Sciences, 2017. – Vol. 59. – P. 13-23.

WEB GIS

Web GIS – это GIS приложения, которые перенесены на web-сервисы

Преимущества:

- Не требуется установка
- Данные хранятся на сервере
- Для доступа требуется только браузер



https://nextgis.com/nextgis-com/

Готовые решения

Make your own map

It's easy to make your own map. Just follow these steps:

1. Choose an area.

Pan and zoom the map to an area or search by its name or address.

2. Decide what to show.

Choose a Basemap then Add layers on top of it.

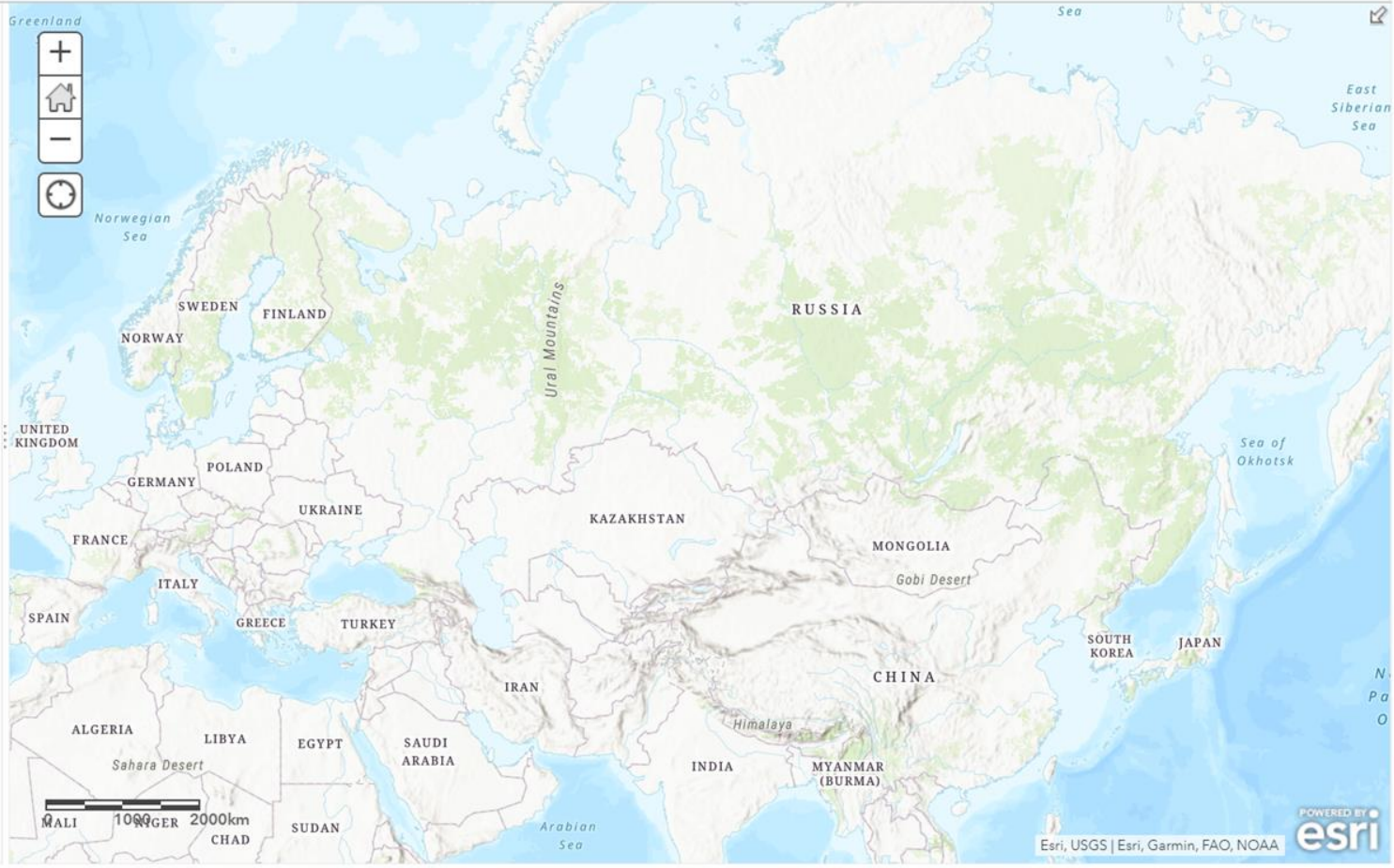
3. Add more to your map.

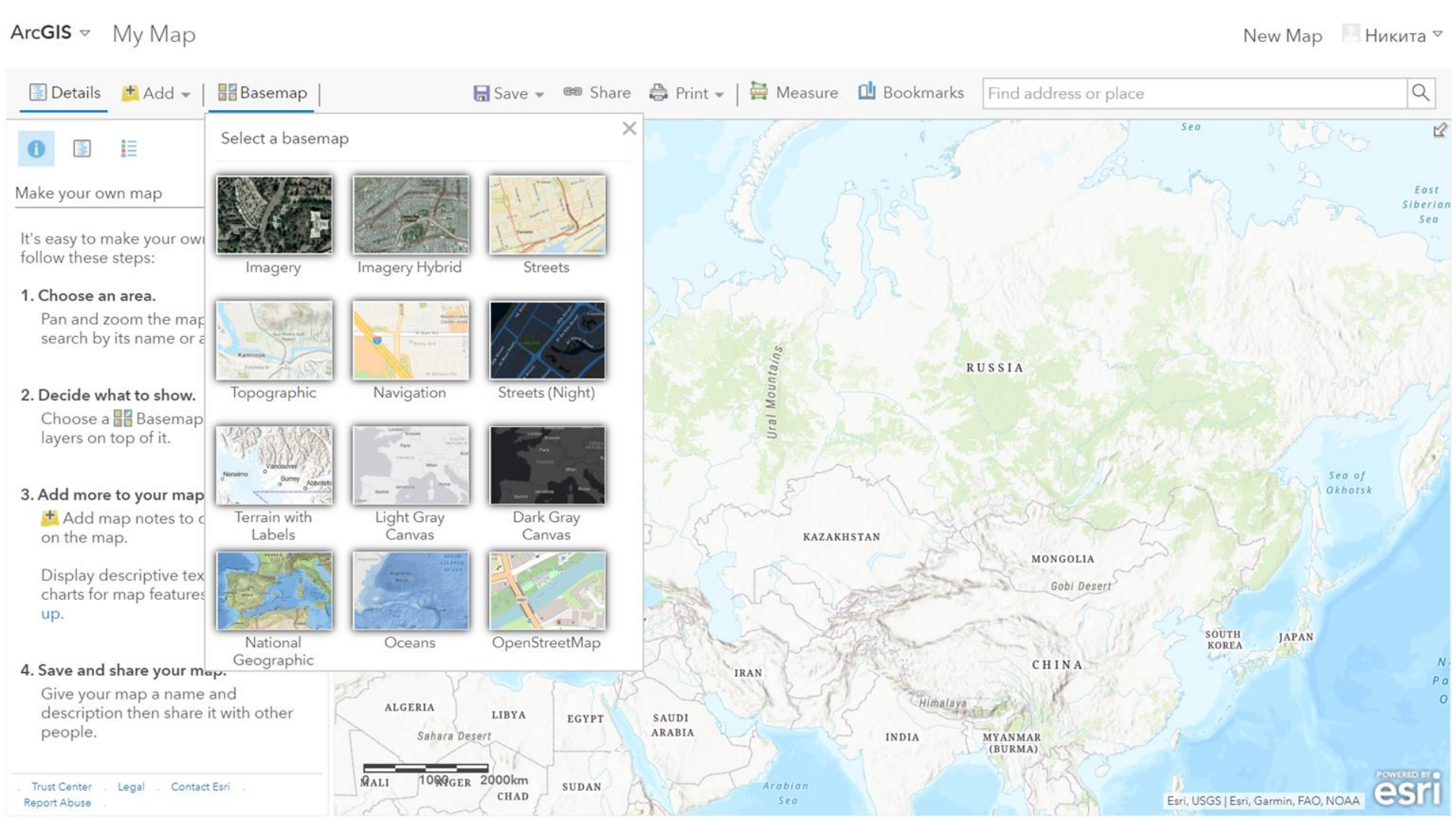
Add map notes to draw features on the map.

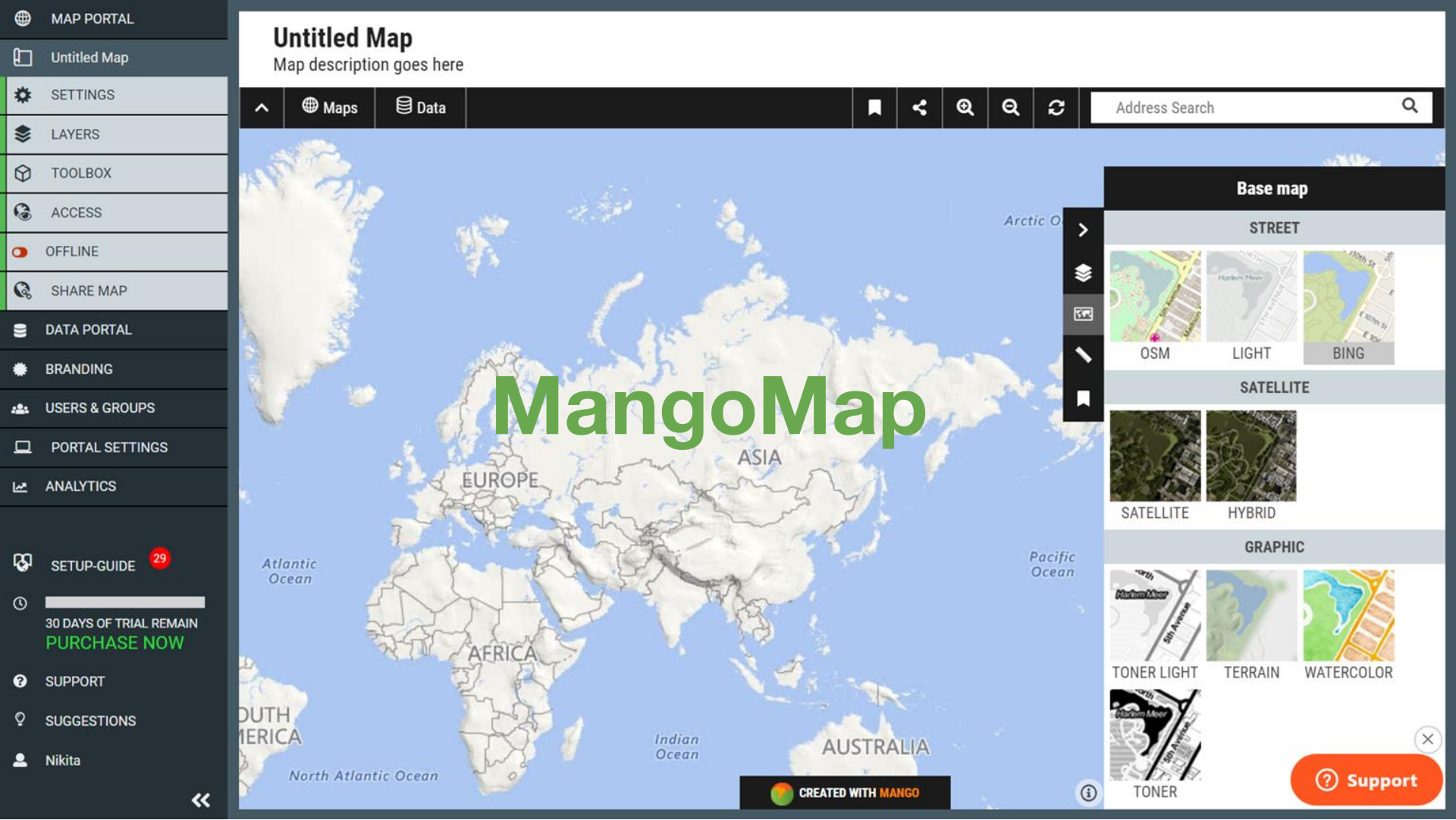
Display descriptive text, images, and charts for map features in a pop-up.

4. Save and share your map.

Give your map a name and description then share it with other people.

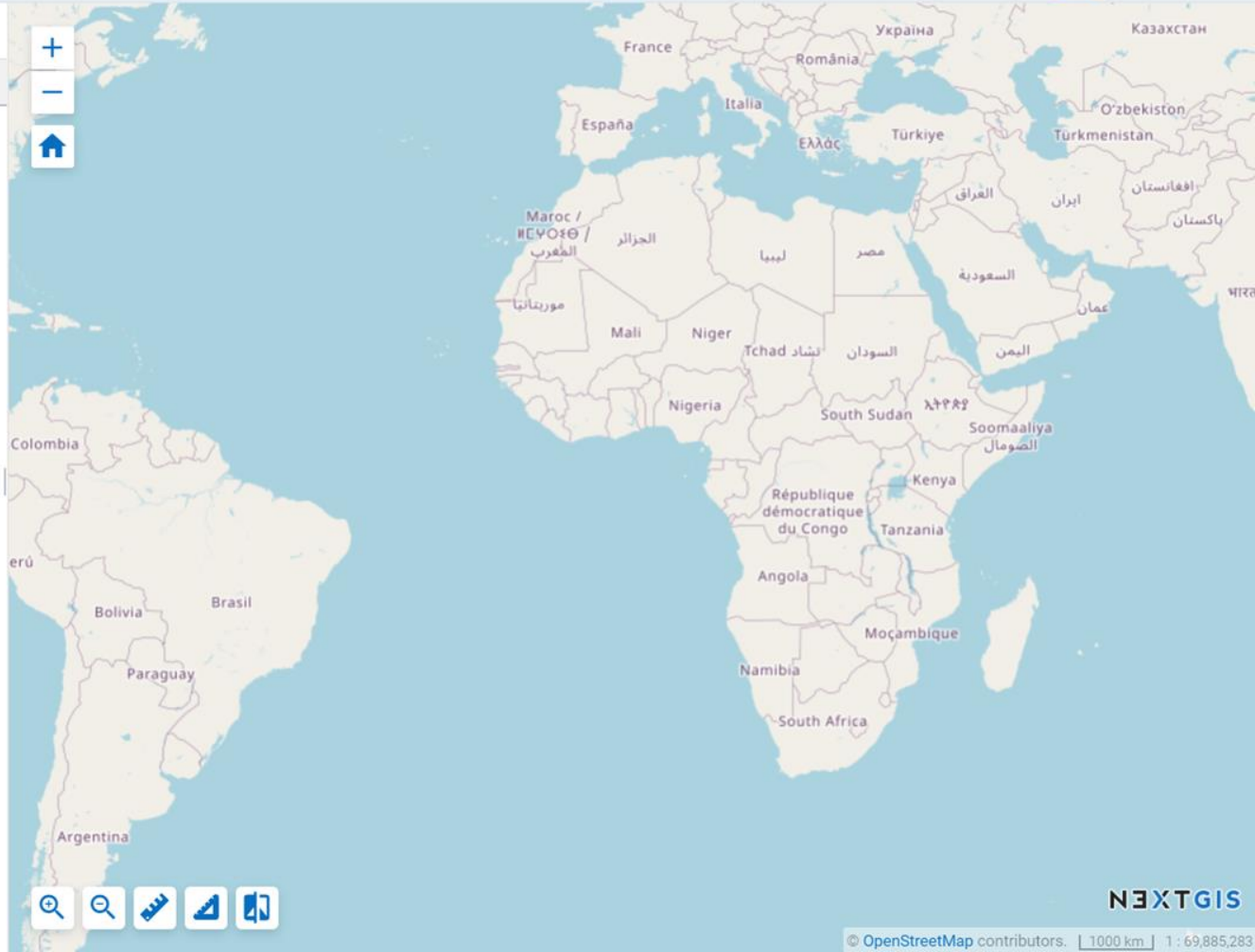



ArcGIS
My Map
New Map
Никита
Details
Add
Basemap
Save
Share
Print
Measure
Bookmarks
Find address or place
Make your own map
It's easy to make your own map. Just follow these steps:
1. Choose an area.
Pan and zoom the map or search by its name or address.
2. Decide what to show.
Choose a Basemap or add layers on top of it.
3. Add more to your map.
Add map notes to customize on the map.
Display descriptive text and charts for map features you set up.
4. Save and share your map.
Give your map a name and description then share it with other people.
Trust Center
Legal
Contact Esri
Report Abuse
Select a basemap
Imagery
Imagery Hybrid
Streets
Topographic
Navigation
Streets (Night)
Terrain with Labels
Light Gray Canvas
Dark Gray Canvas
National Geographic
Oceans
OpenStreetMap
RUSSIA
Ural Mountains
KAZAKHSTAN
MONGOLIA
Gobi Desert
CHINA
IRAN
SAUDI ARABIA
INDIA
MYANMAR (BURMA)
SOUTH KOREA
JAPAN
Himalaya
Sahara Desert
ALGERIA
LIBYA
EGYPT
MALI
NIGER
CHAD
SUDAN
Arabian Sea
Sea of Okhotsk
East Siberian Sea
0 1000 2000km
Esri, USGS | Esri, Garmin, FAO, NOAA
POWERED BY esri


MAP PORTAL
Untitled Map
SETTINGS
LAYERS
TOOLBOX
ACCESS
OFFLINE
SHARE MAP
DATA PORTAL
BRANDING
USERS & GROUPS
PORTAL SETTINGS
ANALYTICS
SETUP-GUIDE
29
30 DAYS OF TRIAL REMAIN
PURCHASE NOW
SUPPORT
SUGGESTIONS
Nikita
Untitled Map
Map description goes here
Maps
Data
Address Search
MangoMap
ASIA
EUROPE
AFRICA
AUSTRALIA
Atlantic Ocean
Pacific Ocean
Indian Ocean
North Atlantic Ocean
Arctic O
CREATED WITH MANGO
Base map
STREET
OSM
LIGHT
BING
SATELLITE
SATELLITE
HYBRID
GRAPHIC
TONER LIGHT
TERRAIN
WATERCOLOR
TONER
Support

Layers

Layer



OpenStreetMap

Main resource group

Display name Main resource group
Type Resource group (resource_group)
Owner Administrator

Child resources

Display name ↑	Type	Owner
Main web map	Web map	Administrator

User permissions

Resource	resource	
Read	read	A
Create	create	A
Update	update	A
Delete	delete	A

CREATE RESOURCE

PostGIS connection
PostGIS layer
Raster layer
Resource group
Vector layer
Web map
WFS service
WMS connection
WMS layer
WMS service

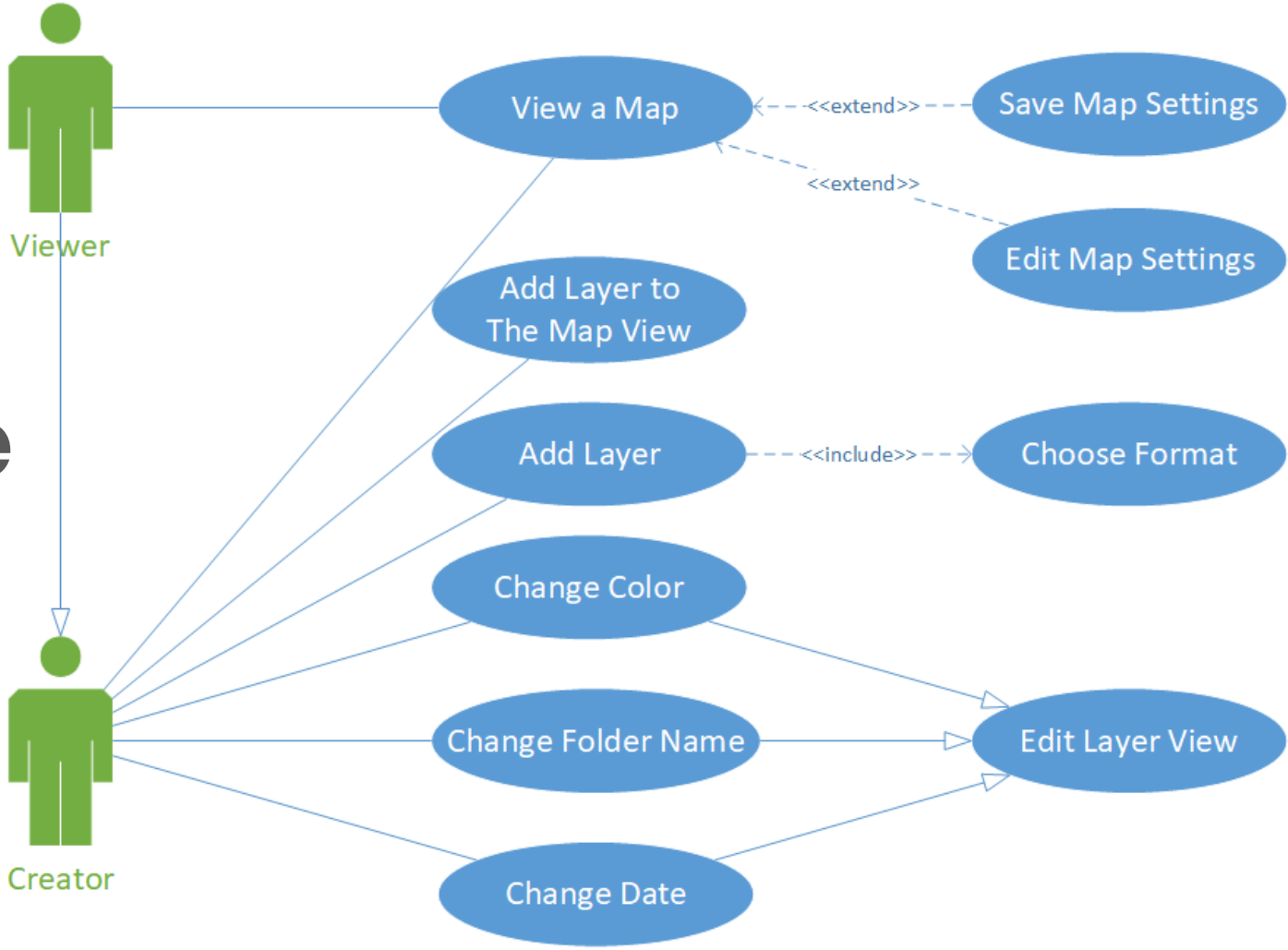
EXTRA

JSON view

ACTION

Delete
Update

Use Case


Viewer
Creator
View a Map
Save Map Settings
<<extend>>
<<extend>>
Edit Map Settings
Add Layer to
The Map View
Add Layer
<<include>>
Choose Format
Change Color
Change Folder Name
Edit Layer View
Change Date

Форматы геоданных

Протокол	WMTS	WMS	WFS
доступные форматы геоданных из Capabilities.xml	1. png 2. jpeg 3. GeoJson **4. GeoTiff**	1. png 2. jpeg 3. GeoJson 4. TopoJson	1. GML 2. KML 3. XML 4. Shape

Поддержка времени для всех протоколов

Поддержка сырых данных

Концептуальная схема

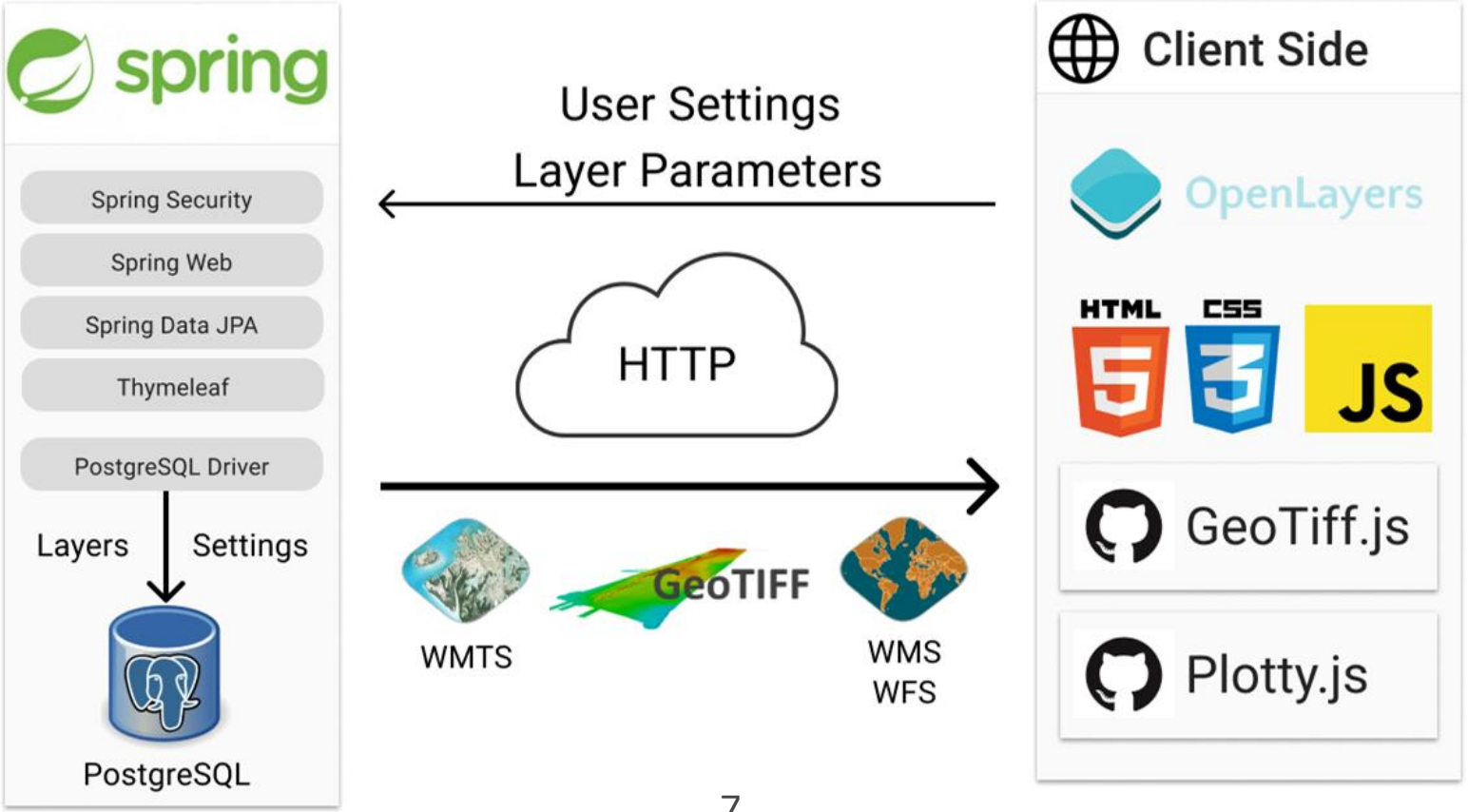


Диаграмма ERD серверной части

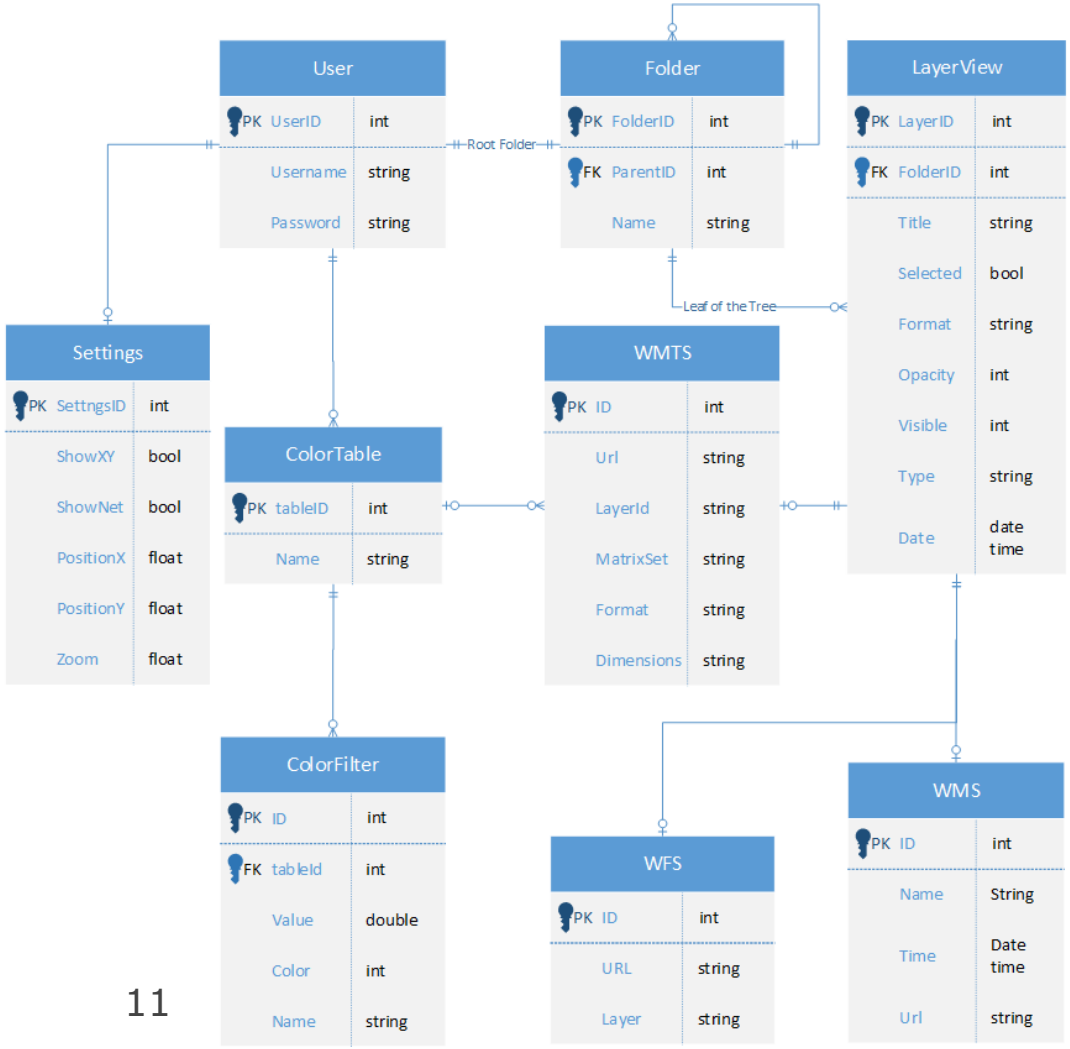
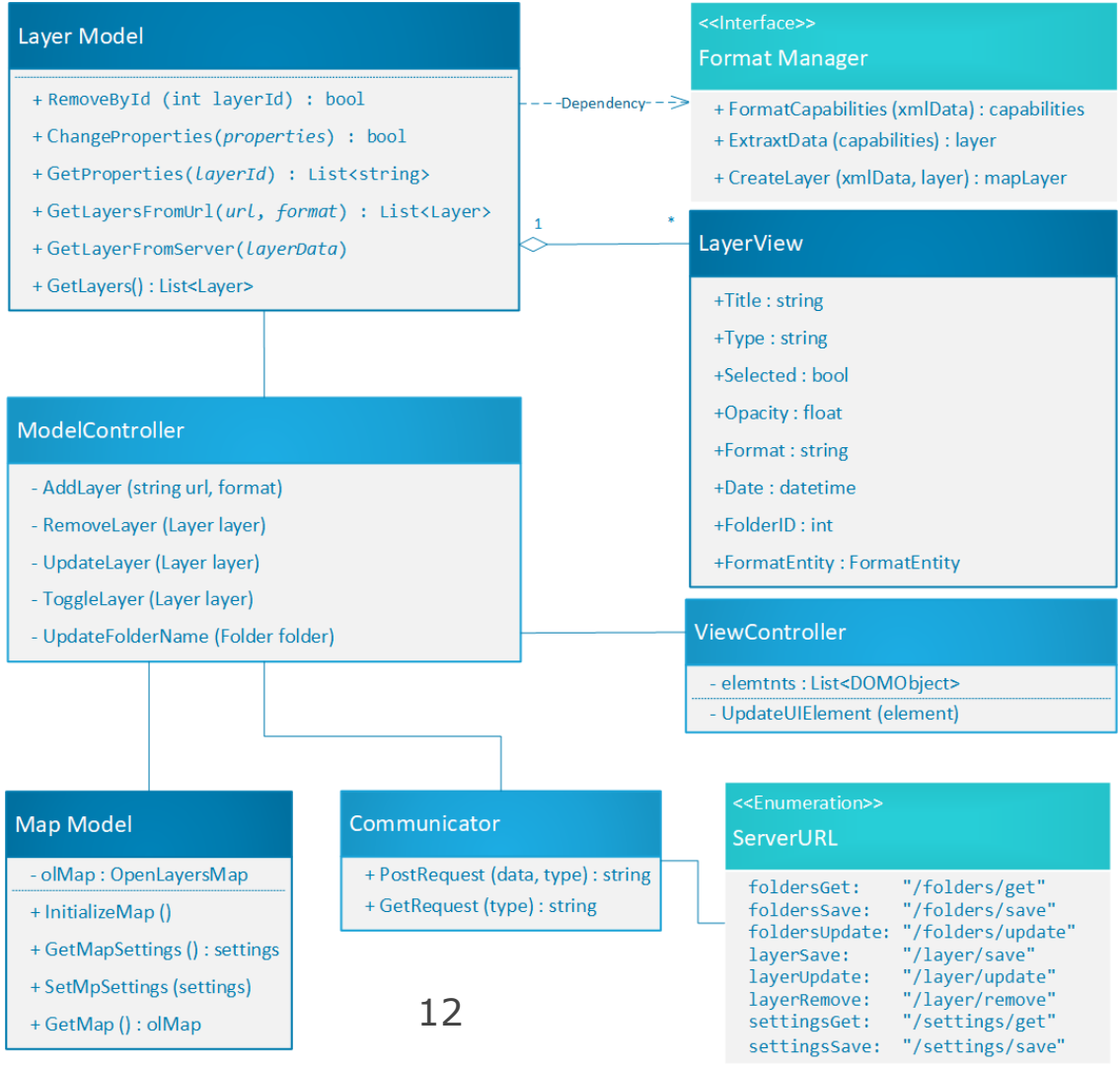


Таблица фильтров

Диаграмма классов клиентской части



Интерфейс приложения

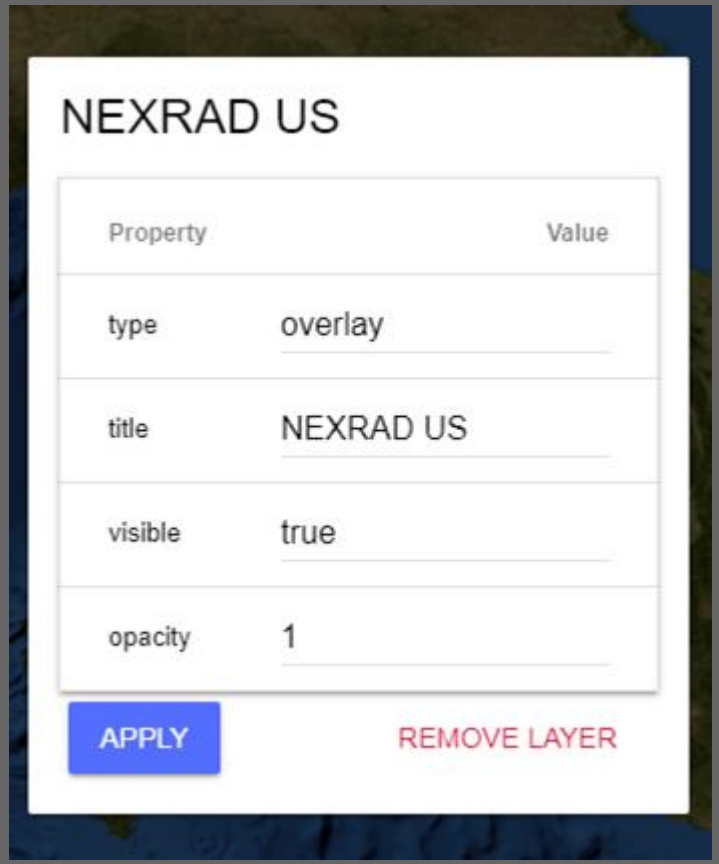
Генерация интерфейса

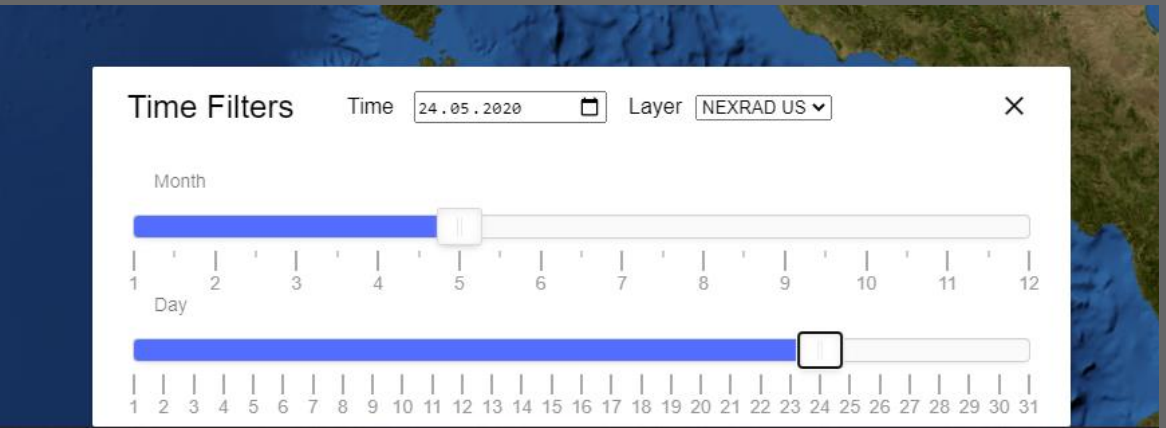
```
let divsPool = {};
      let user;
      communicator.getUser().then(response => {
      user = JSON.parse(response);

      const colorTables = user.colorTables;
      setupColorTableList(colorTables);

      const settings = user.settings;
      setMapSettings(settings);

      const folders = user.rootFolder;
      generator.treeViewGenerator(folders,'Layers',layerModel.getWMTSLayerFromServer)
            .then(result => {
                  divsPool = result[1];
                  divsPool.layersList = result[0];
                  document.getElementById('tools').appendChild(result[0]);
                  componentHandler.upgradeDom();
                              });
      });
```

UI на
Material Design Lite

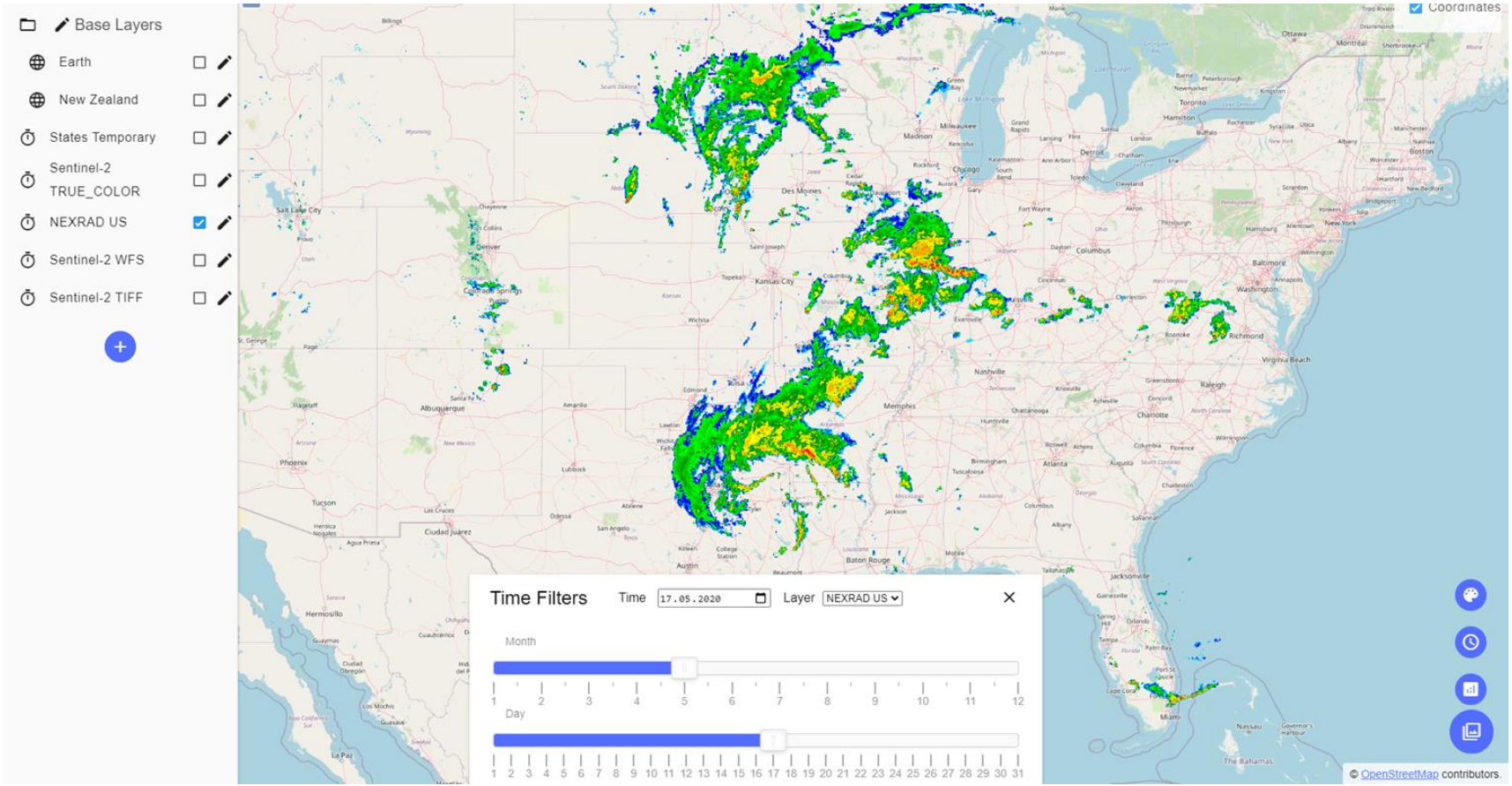
https://getmdl.io/started/index.html


Sent
Save Color Table
Color Table name
myColorTable
UPDATE CURRENT
CREATE NEW
Custom
first
NDVI
portland
0.5
0.5

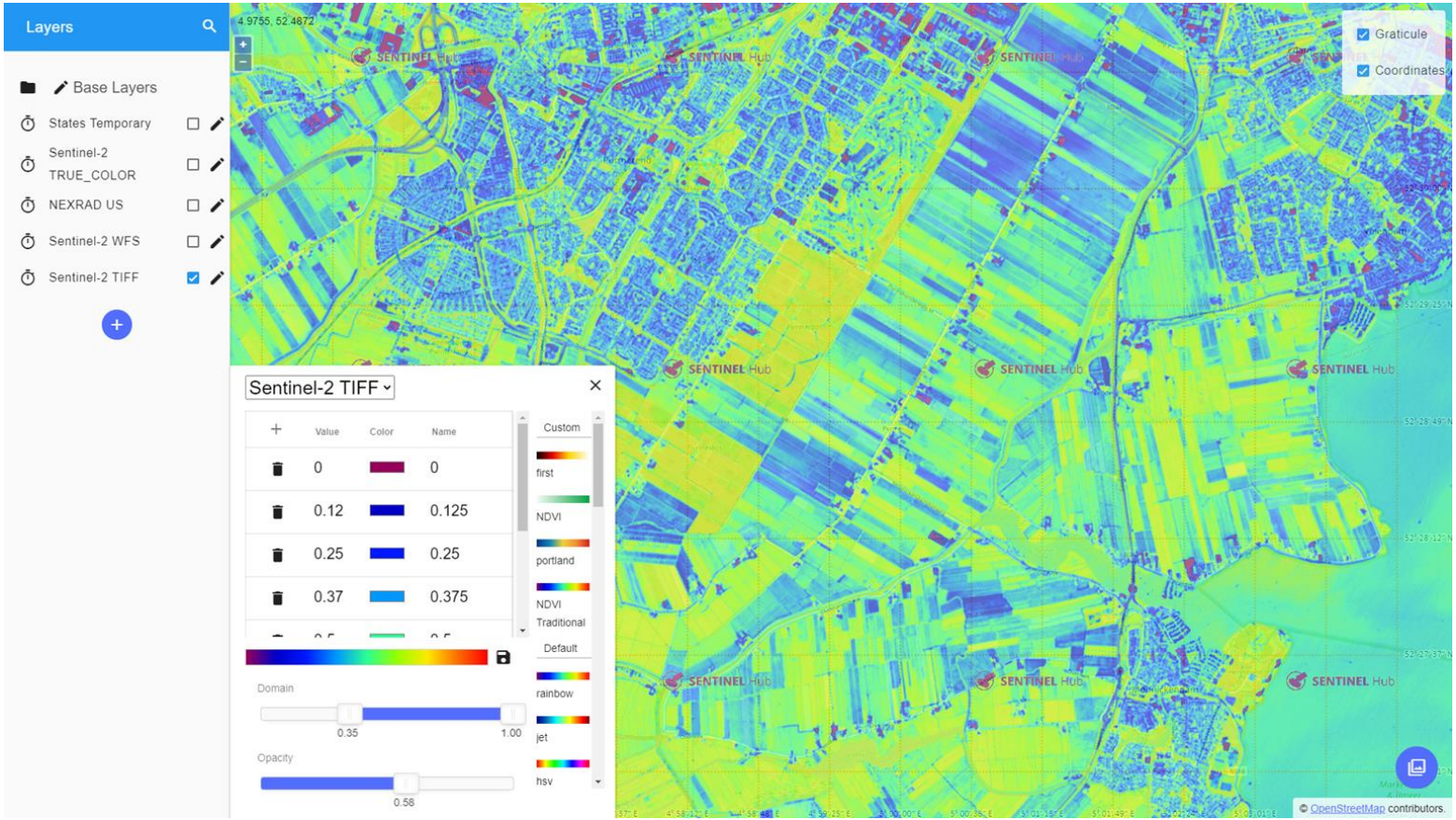

NEXRAD US
Property
Value
type
overlay
title
NEXRAD US
visible
true
opacity
1
APPLY
REMOVE LAYER


Time Filters
Time
24.05.2020
Layer
NEXRAD US
Month
1 2 3 4 5 6 7 8 9 10 11 12
Day
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Установка времени



Цветовые фильтры для GeoTiff



GeoTiff в OpenLayers

Назначение функции загрузки

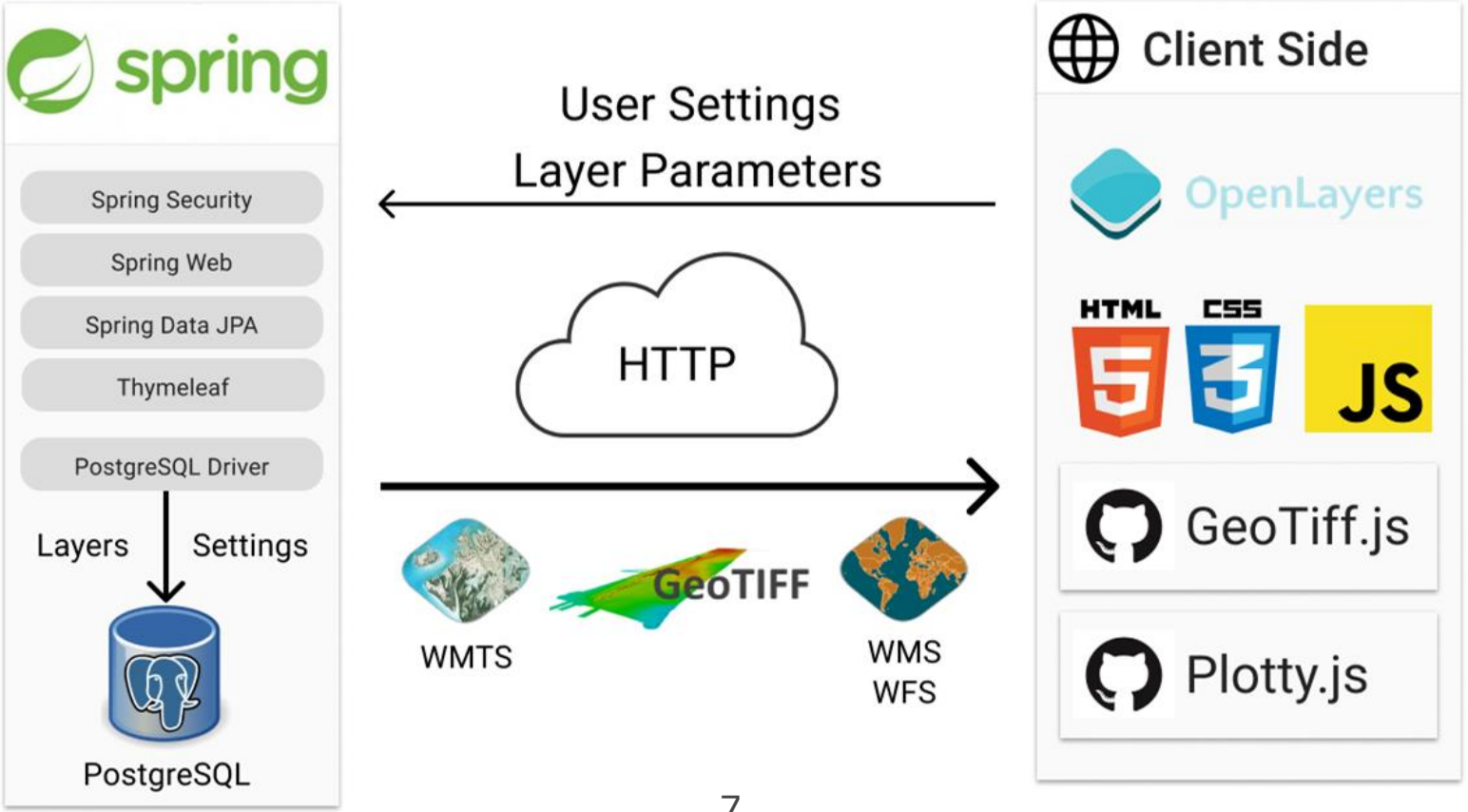
```
layer.getSource()
      .setTileLoadFunction(
        this.tileLoadFunction.bind(this)
      );
```

```
olGeoTiff.prototype.tileLoadFunction = function(imageTile, src) {

    // replace the imageTile with a canvas
    let imageCanvas = document.createElement( tagName: 'canvas');
    imageCanvas.naturalWidth = this.plotOptions.width;
    imageCanvas.naturalHeight = this.plotOptions.height;
    imageCanvas.width = this.plotOptions.width;
    imageCanvas.height = this.plotOptions.height;
    imageTile.unlistenImage_();
    imageTile.image_ = imageCanvas;
    imageTile.imageListenerKeys_ = [
        listen(imageTile.image_, type: 'error', imageTile.handleImageLoad_, imageTile, opt_once: true),
        listen(imageTile.image_, type: 'load', imageTile.handleImageLoad_, imageTile, opt_once: true)
    ];

    // fetch data of this tile
    this.fetchTiff(
        // url of tile
        src,
        // callback function that executes when the tiff is parsed and ready
        function (urlToTiff) {...}.bind(this),
        // callback function in case of AJAX error
        errorListener: function (error) {...}
    );
};
```

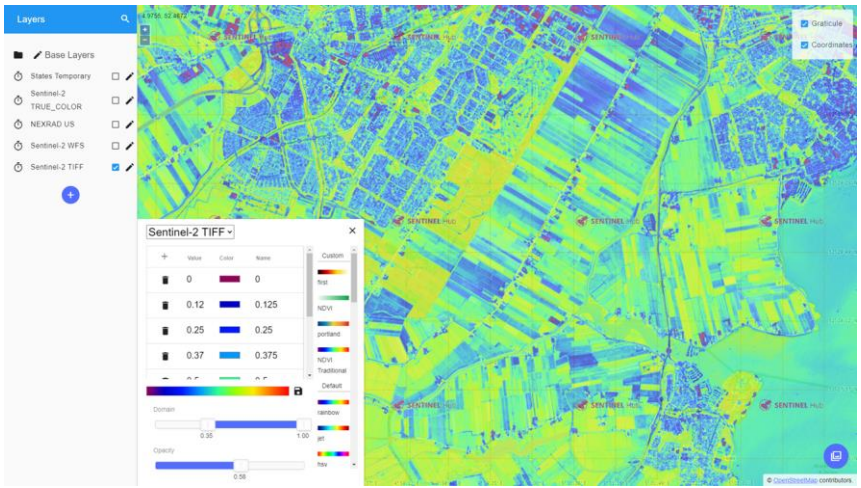
```
/**
 * fetch tiff and set callbacks
 * @param {*} url url of the geotiff file
 * @param {*} listener callback on ajax success
 * @param {*} errorListener callback on ajax error
 */
olGeoTiff.prototype.fetchTiff = async function (url, listener, errorListener) {
    let urlToTiff = this.urlToTiff;
    if (urlToTiff[url]) {
        // in this case the tiff is already received and parsed
        if (urlToTiff[url].rasters) {
            listener(urlToTiff[url]);
        } else if (urlToTiff[url].error) {
            errorListener(urlToTiff[url].error);
        }
        // in this case the tiff was already requested
        else {
            urlToTiff[url].listeners.push(listener);
            urlToTiff[url].errorListeners.push(errorListener);
        }
    }
    // in this case the tiff was not yet requested
    else {...}
};
```

```
function (urlToTiff) {
    // get plotty instance
    let plot = this.plot;

    // set plotty settings
    plot.setDomain(this.plotOptions.domain);
    plot.setData(
        this.plotOptions.data(urlToTiff.rasters),
        urlToTiff.width, //this.plotOptions.width,
        urlToTiff.height,//  this.plotOptions.height
    );
    if (this.plotOptions.palette)
        plot.setColorScale(this.plotOptions.palette);
    if (this.plotOptions.noDataValue !== false)
        plot.setNoDataValue(this.plotOptions.noDataValue);

    // render plot and trigger load event
    plot.render();
    imageCanvas.getContext( contextId: '2d').drawImage(plot.getCanvas(),  dx: 0,  dy: 0);
    imageCanvas.dispatchEvent(new Event( type: 'load'));
}.bind(this),
```

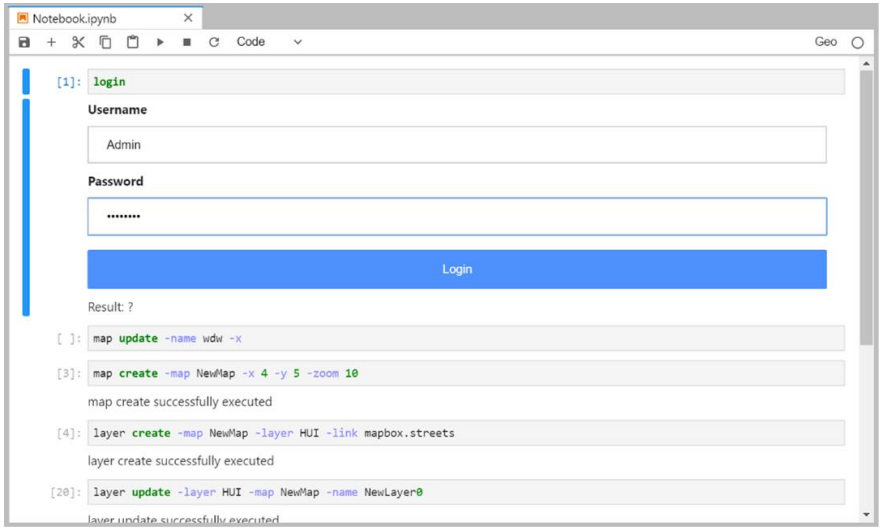
Концептуальная схема



План дальнейшей разработки

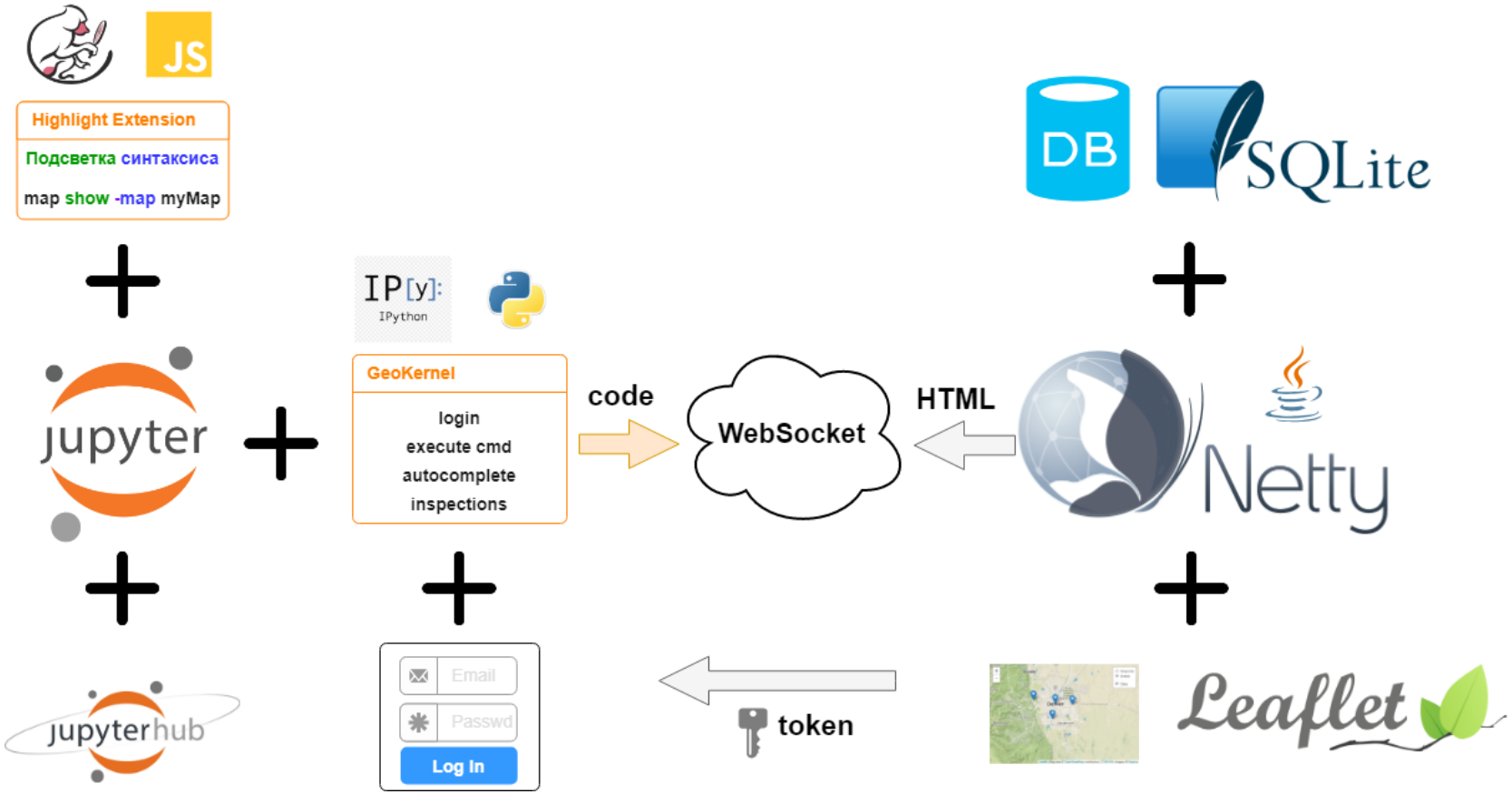


Web GIS



Аналитический модуль

Аналитический модуль JupyterLab



Спасибо за внимание!