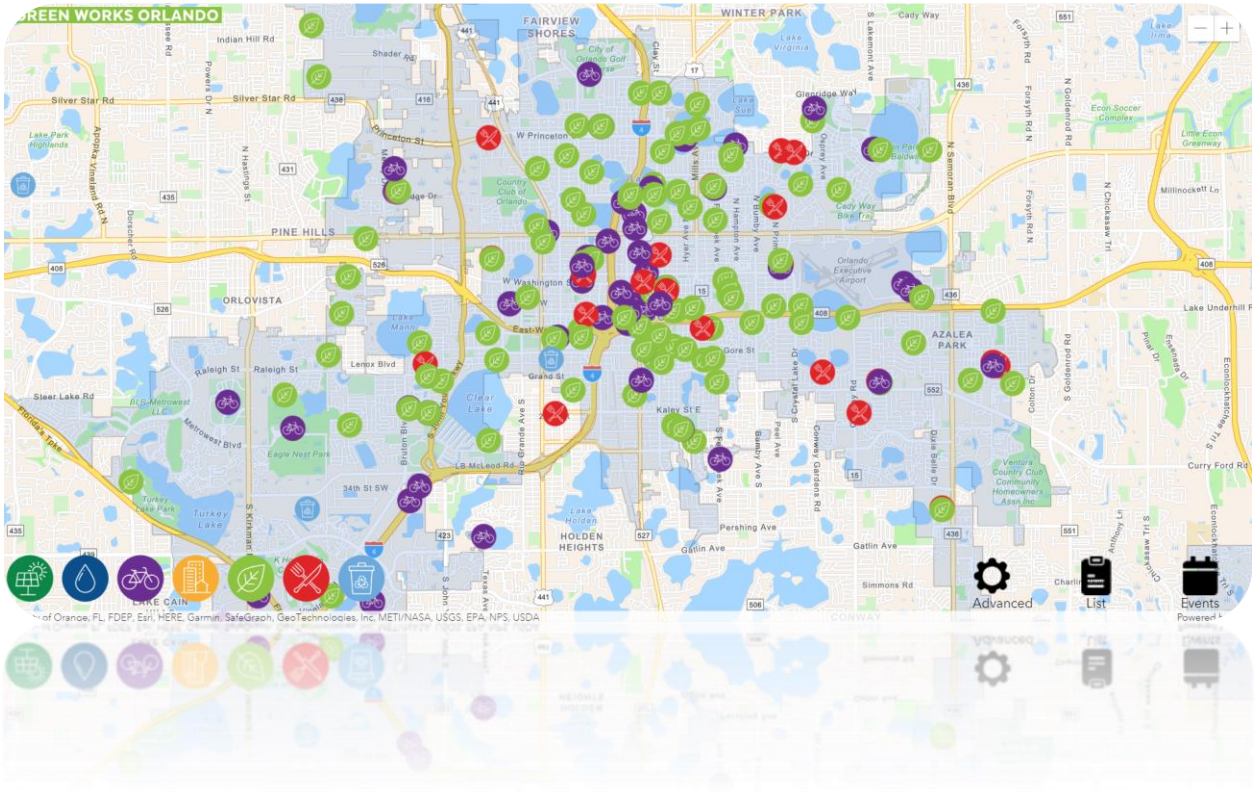
Developer Documentation

Greenworks Map Project



Conceptual Approach

At first, this project might appear to be complicated. The project can be simplified to its core purpose of retrieving data and displaying that data on a map. Understanding the project is about understanding where data is coming from and where data is going at every point. Once the flow of data is understood, gaining an understanding of how data is manipulated as it flows through the program is the next step. Working on this project does require fundamental knowledge of many different technologies.

Project Internals (Languages, Frameworks, and Libraries)

The project runs on Java 8 and JavaScript. Tomcat 10 is required to run the project on a web server.

Frontend: JavaScript, ArcGIS, and jQuery.

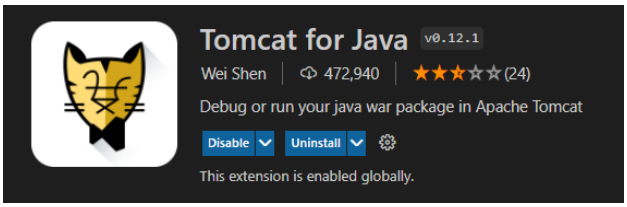
Backend: Java 8, Maven, Junit, Hibernate ORM, Jakarta Servlets, MySQL Connector, Tiny Log, and Jersey.

The project GitHub can be found here.

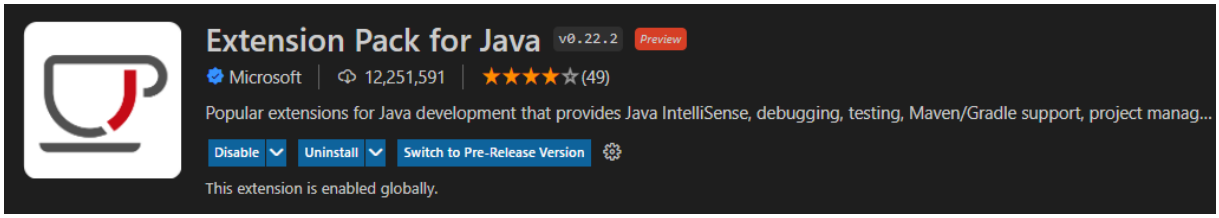
IDE (Visual Studio Code)

The IDE that has been primarily used in this project is Visual Studio Code. An install guide can be found here. The project can be imported into Eclipse. One benefit that Visual Studio Code has over Eclipse is that Visual Studio Code is noticeably faster.

Visual Studio Code Extensions (Tomcat and Java Extension)



Visual Studio Code will require two extensions: Tomcat for Java and the Extension Pack for Java. These extensions can be installed through the IDE.



Visual Database Tools (MySQL Workbench and phpMyAdmin)

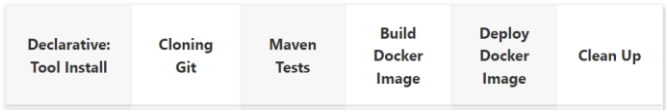
For visual database tools, we use MySQL Workbench Version 8 and/or phpMyAdmin. The project is configured for MySQL, it is likely the case that other database visualization tools will be compatible with the project. MySQL Workbench download can be found here. phpMyAdmin download can be found here.

Version Control (GitHub, Git Bash, and GitHub Desktop)

Of course, version control and repository management are a necessity to keep any project on track. For version control and repository management, we chose to use GitHub, Git Bash, and/or the GitHub Desktop. GitHub account creation can be found here. Information on installing Git can be found here. GitHub Desktop can be found here.

Deployment Pipeline and Utilized Software (Jenkins, Maven, JUnit, and Docker)

For the project, we decided that it would be best to have a script that would take our project from the GitHub repository and send it to Docker Hub as a fully configured container. For this to happen, the project is pulled, built, and uploaded to Docker Hub. Information on installing Jenkins can be found here. Information about Maven can be found here. Information about Junit can be found here. Information on installing Docker Desktop can be found here. Creating a Docker Hub account can be done here. A tutorial on how to create pipeline scripts can be found here.



Server (Ubuntu 20)

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Welcome to Ubuntu 20.04.3 LTS (GNU/Linux 5.4.0-97-generic x86_64)
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For development, we used an Ubuntu server that had 1 GB of RAM and a single virtual core. We acquired our server through DigitalOcean for a flat monthly $5 fee. For accessing our server we'd use SSH software. MobaXterm is an excellent SSH tool. However, there are dozens of free-to-use SSH tools and all of them fulfill the same purpose. MobaxTerm can be downloaded here. Information on enabling SSH on an Ubuntu server can be found here. Information on how to SSH into a server can be found here.

Server Software

The server needs certain software to run the project container. The only software the server needs is MySQL and Docker. MySQL will need to have TCP enabled. Information on installing MySQL on an Ubuntu server can be found here. Information on enabling TCP can be found here and here. Information on installing Docker in an Ubuntu server can be found here.

API

To add map points easily and without user input, EcoMap utilizes different API's.

OpenCharge - https://openchargemap.org/site

Adds electric charging stations to map.

NREL API - https://developer.nrel.gov/

National Renewable Energy network helps developers access and use energy data via Web services, including renewable energy and alternative fuel data.

Developer Notes

Although the project can be used by simply navigating to the server where it's being hosted. To setup the project, the intention was to use an HTML <iframe> on the city of Orlando's main website. This way if the city was to ever update the website, EcoMap would be unaffected.

The Advanced Filter options (subpillars) can be changed to icons by modifying the MySQL table and adding thumbnail images. These thumbnails must be in the icons folder. To add additional subpillars, you must do this through MySQL, as there is no admin interface to do this.

Ensure you are using Tomcat 10, otherwise you will run into issues.

Check the Documentation folder for additional notes and information.