Center for Spatial Information Science and Systems
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GeoFairy GroundTruth Server Installation Guide

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Date	Author	Description
17 April 2023	Gil Heo	Initial Document

2. Prerequisites

2.1 System Requirements

The GeoFairy GroundTruth Server is a Spring Boot application, and the application is packed as a single JAR file.

2.1.1 Hardware Requirements

The GeoFairy GroundTruth Server is running as a Spring Boot application. The minimum hardware requirement of the server is too low and it can run any modern PC environment, but for the best performance, multicore processor, sufficient memory, and large capacity of storage are recommended.

This is the current running GMU GeoFairy GroundTruth server's environment. Note, it's not a minimum requirement.

- Processor: Dual Xeon(R) CPU E5-2640 @ 2.50 GHz (12 cores, 24 threads)
- Memory: 16 GB
- Storage: 1 TB

2.1.2 Software Requirements

To run the GeoFairy GroundTruth Server, Java runtime and PostgreSQL database are required.

- Operating System: Linux (ubuntu 18.04 LTS or higher)
- Java version: Java 11 or higher
- Database: PostgreSQL 12.x or higher
- HTTP server (optional): Apache HTTP server 2.4.x, for applying reverse proxy

2.2 PostgreSQL

PostgreSQL is a powerful, open source object-relational database system with over 35 years of active development that has earned it a strong reputation for reliability, feature robustness, and performance.

2.2.1 Installing on Debian/Ubuntu

To install PostgreSQL binaries, install the postgresql package by running:

```
$ sudo apt install postgresql postgresql-client
$ sudo systemctl start postgresql.service
```

For most systems, the default PostgreSQL user is "postgres" and a password is not required for authentication. Thus, to add a password, you must first login and connect as the "postgres" user.

With a connection now established to PostGreSQL at the psql prompt, issue the "ALTER USER" command to change the password for the "postgres" user.

```
$ sudo -u postgres psql

postgres=# ALTER USER postgres PASSWORD 'myPassword';
ALTER ROLE
postgres=# \q
```

If you meet an error (e.g., authentication error), or want to find more useful information about installing PostgreSQL on Ubuntu, please refer the following URL:

```
https://ubuntu.com/server/docs/databases-postgresql
```

2.3 Other Requirements

2.3.1 Java runtime

"openjdk" (or similar java runtimes) package are essential. The portal is tested in JDK 11 release.

```
$ sudo apt install openjdk-11-jdk
```

3. Installation

The installation steps of the GeoFairy GroundTruth Server are following:

- Step1) Set PostgreSQL – for creating a database and a user for "geofairy"
- Step2) Set "/Data" directory – for storing ground truth attachment files
- Step3) Execute the GeoFairy GroundTruth Server application

3.1 Step1) PostgreSQL Settings

The GeoFairy GroundTruth Server uses PostgreSQL as a database for managing user and ground truth information. For PostgreSQL to support the server, the followings are required:

- host: localhost (installed on the same host)
- port: 5432 (default port)
- database name: geofairy
- username: geofairy (grant proper privileges)
- password: GeofairyProject2022. (don't miss the ending dot)

3.1.1 Creating a database, named "geofairy"

To create a database named "geofairy", type the following command:

```
$ sudo -u postgres createdb geofairy
$ sudo -u postgres psql -c "\l"
```

3.1.2 Creating a user, named "geofairy"

To create a user named "geofairy" with password "GeofairyProject2022.", type the following commands. The user should be granted proper role.

```
$ sudo -u postgres psql

postgres=# CREATE USER geofairy WITH ENCRYPT PASSWORD 'GeofairyProject2022.';
postgres=# GRANT CREATE PRIVILEGES ON DATABASE geofairy TO geofairy;
postgres=# \du
postgres=# \q
```

You can check database and user are created correctly by using database client tools like "DBeaver". Try a connection test with host "localhost", port number "5432" (default), database "geofairy" with username "geofairy" and password "GeofairyProject2022.". If the connection is successful without any error, all database settings are done.

3.2 Step2) "/Data" Setting

Attachment photos submitted from GeoFairy Apps are stored into a directory of the server. The default directory is "/Data". You can create any place which has enough storage space, and just make a symbolic link at the root directory.

The following shows how to create a directory for the named "/Data".

```
$ cd /media     (any place you want)
$ sudo mkdir Data
$ cd /
$ sudo ln -s /media/Data .
```

Note) The user account who executes the server should have a writing permission to the directory "/Data". If the directory does not have proper permission, storing job for the ground truth photos by the server will be failed.

```
$ sudo chown -R <userid>.<groupid> /media/Data
```

3.3 Step3) Installing GeoFairy GroundTruth Server

The GeoFairy GroundTruth Server is a Spring Boot application, and it is packed a single JAR file. The application can be downloaded the following URL. Choose the newest one.

```
https://geobrain.csiss.gmu.edu/Geofairy/

ex) https://geobrain.csiss.gmu.edu/Geofairy/GeoFairyGroundTruthServer-X.X.X-
SNAPSHOT_PostgreSQL_yyyymmdd.jar
```

The GeoFairy GroundTruth Server can be starting with a following command:

```
$ java -jar GeoFairyGroundTruthServer-X.X.X-SNAPSHOT_PostgreSQL_yyyymmdd.jar

# Background execution:
$ nohup java -jar GeoFairyGroundTruthServer-X.X.X-SNAPSHOT_PostgreSQL_yyyymmdd.jar &
```

The default settings are:

- port: 8081
- Administrator account: geofairy@gmail.com
- Administrator password: GeofairyProject2022.

If you want to change default settings, you can add the following parameters in the middle of the command line:

```
-Dserver.port=8082                    # change port number to 8082
-Dgeofairy.data.path=/media/data      # change default photo storage path to /media/data

Ex)
$ java -Dserver.port=8082 -jar GeoFairyGroundTruthServer-X.X.X.jar
```

The portal by the following URL:

```
http://localhost:8081/GeoFairyGroundTruthServer/portal/
```

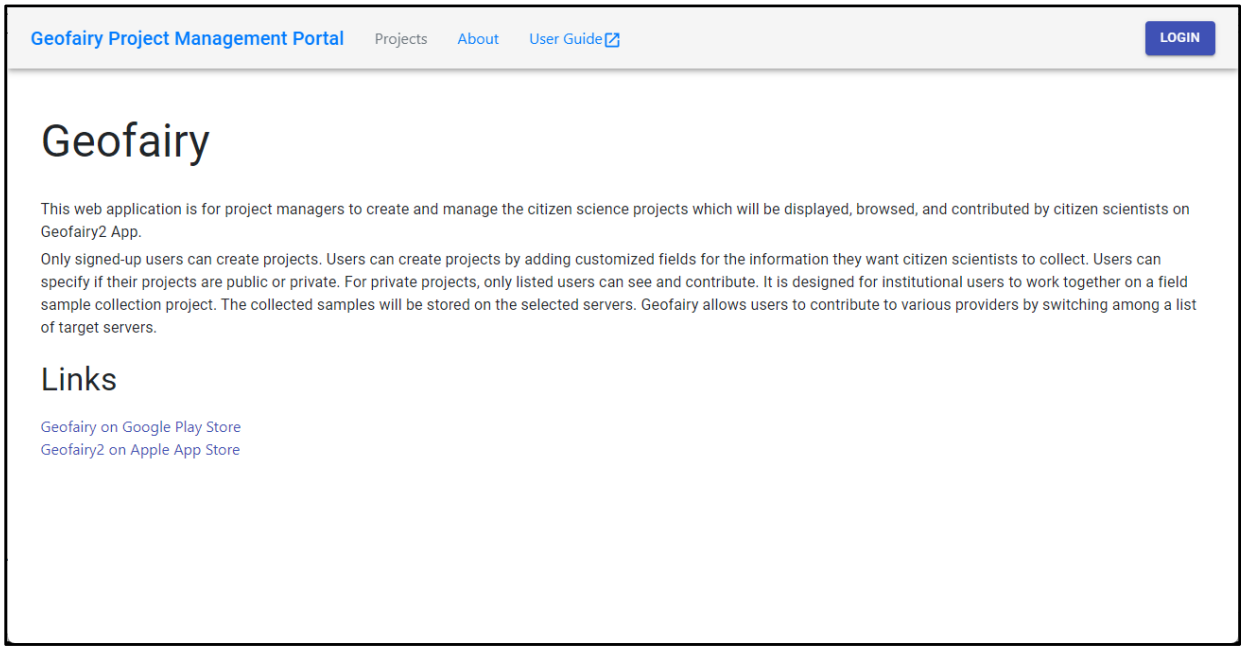

Figure 1. GeoFairy GroundTruth Server Home Screen

4. Post-installation Steps

4.1 Verifying Tables in Database

After the first execution of the GeoFairy GroundTruth server, all tables in the database are created automatically. The tables are shown the following commands:

```
$ sudo -u postgres psql -d geofairy

postgres=# \dt
```

If not listed any tables, please contact the GeoFairy support team.

4.2 Registering your server to GeoFairy server list

To access installed server by GeoFairy smartphone App, the server should be registered into the GeoFairy GroundTruth server list. Currently registered servers are listed by accessing the following URL:

```
https://cloud.csiss.gmu.edu/geofairyserverlist.txt
```

If you want to register your own server into the GeoFairy server list, please contact the GeoFairy technical support team.