SEED Platform Documentation

Release 2.7.0-Beta

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CONTENTS

The Standard Energy Efficiency Data (SEED) Platform™ is a web-based application that helps organizations easily manage data on the energy performance of large groups of buildings. Users can combine data from multiple sources, clean and validate it, and share the information with others. The software application provides an easy, flexible, and cost-effective method to improve the quality and availability of data to help demonstrate the economic and environmental benefits of energy efficiency, to implement programs, and to target investment activity.

The SEED application is written in Python/Django, with AngularJS, Bootstrap, and other JavaScript libraries used for the front-end. The back-end database is required to be PostgreSQL.

The SEED web application provides both a browser-based interface for users to upload and manage their building data, as well as a full set of APIs that app developers can use to access these same data management functions.

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CHAPTER

ONE

GETTING STARTED

1.1 Development Setup

1.1.1 Installation on OSX

These instructions are for installing and running SEED on Mac OSX in development mode.

Quick Installation Instructions

This section is intended for developers who may already have their machine ready for general development. If this is not the case, skip to Prerequisites. Note that SEED uses python 3.

- install Postgres 11.1 and redis for cache and message broker
- install PostGIS 2.5 and enable it on the database using *CREATE EXTENSION postgis;*
- install TimescaleDB 1.4.1
- use a virtualenv (if desired)
- *git clone git@github.com:seed-platform/seed.git*
- create a *local_untracked.py* in the *config/settings* folder and add CACHE and DB config (example *local_untracked.py.dist*)
- to enable geocoding, get MapQuest API key and attach it to your organization
- *export DJANGO_SETTINGS_MODULE=config.settings.dev* in all terminals used by SEED (celery terminal and runserver terminal)
- ***pip install -r requirements/local.txt***
  - for condas python, you way need to run this command to get pip install to succeed: *conda install -c conda-forge python-crfsuite*
- bin/install_javascript_dependencies.sh
- *./manage.py migrate*
- *./manage.py create_default_user*
- *./manage.py runserver*
- *DJANGO_SETTINGS_MODULE=config.settings.dev celery -A seed worker -l info -c 4 –maxtasksperchild=1000 –events*
- navigate to *http://127.0.0.1:8000/app/#/profile/admin* in your browser to add users to organizations
- main app runs at *127.0.0.1:8000/app*

The *python manage.py create_default_user* will setup a default *superuser* which must be used to access the system the first time. The management command can also create other superusers.

```
./manage.py create_default_user --username=demo@seed.lbl.gov --organization=lbl --
↪password=demo123
```

Prerequisites

These instructions assume you have MacPorts or Homebrew. Your system should have the following dependencies already installed:

- git (*port install git* or *brew install git*)
- graphviz (*brew install graphviz*)
- pyenv (Recommended)

> **Note:** Although you *could* install Python packages globally, this is the easiest way to install Python packages. Setting these up first will help avoid polluting your base Python installation and make it much easier to switch between different versions of the code.

```
brew install pyenv
pyenv install <python3 version you want>
pyenv virtualenv <python3 version you want> seed
pyenv local seed
```

PostgreSQL 11.1

MacPorts:

```
sudo su - root
port install postgresql94-server postgresql94 postgresql94-doc
# init db
mkdir -p /opt/local/var/db/postgresql94/defaultdb
chown postgres:postgres /opt/local/var/db/postgresql94/defaultdb
su postgres -c '/opt/local/lib/postgresql94/bin/initdb -D /opt/local/var/db/
↪postgresql94/defaultdb'

# At this point, you may want to add start/stop scripts or aliases to
# ~/.bashrc or your virtualenv ``postactivate`` script
# (in ``~/.virtualenvs/{env-name}/bin/postactivate``).

alias pg_start='sudo su postgres -c "/opt/local/lib/postgresql94/bin/pg_ctl \
    -D /opt/local/var/db/postgresql94/defaultdb \
    -l /opt/local/var/db/postgresql94/defaultdb/postgresql.log start"'
alias pg_stop='sudo su postgres -c "/opt/local/lib/postgresql94/bin/pg_ctl \
    -D /opt/local/var/db/postgresql94/defaultdb stop"'

pg_start

sudo su - postgres
PATH=$PATH:/opt/local/lib/postgresql94/bin/
```

Homebrew:

```
brew install postgres
# follow the post install instructions to add to launchagents or call
# manually with `postgres -D /usr/local/var/postgres`
# Skip the remaining Postgres instructions!
```

Configure PostgreSQL. Replace 'seeddb', 'seeduser' with desired db/user. By default use password *seedpass* when prompted. Use the code block below in development only since the seeduser is a SUPERUSER.

```
createuser -P seeduser
createdb `whoami`
psql -c 'CREATE DATABASE "seeddb" WITH OWNER = "seeduser";'
psql -c 'GRANT ALL PRIVILEGES ON DATABASE "seeddb" TO seeduser;'
psql -c 'ALTER ROLE seeduser SUPERUSER;
```

PostGIS 2.5

MacPorts:

```
# Assuming you're still root from installing PostgreSQL,
port install postgis2
```

Homebrew:

```
brew install postgis
```

Configure PostGIS:

```
psql -d seeddb -c "CREATE EXTENSION postgis;"

# For testing, give seed user superuser access:
# psql -c 'ALTER USER seeduser CREATEDB;'
```

If upgrading from an existing database or existing local_untracked.py file, make sure to add the MapQuest API Key and set the database engine to 'ENGINE': 'django.contrib.gis.db.backends.postgis'.

Now exit any root environments, becoming just yourself (even though it's not that easy being green), for the remainder of these instructions.

TimescaleDB 1.4.1

Note, as of version 1.4.1, dumping and restoring databases requires that both the source and target database have the same version of TimescaleDB.

Downloading From Source:

```
# Note: Installing from source should only be done
# if you have a Postgres installation not maintained by Homebrew.
# This installation requires C compiler (e.g., gcc or clang) and CMake version 3.4 or␣
↪greater.

git clone https://github.com/timescale/timescaledb.git
cd timescaledb
git checkout 1.4.1

# Bootstrap the build system
```

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```
./bootstrap

# If OpenSSL can't be found by cmake - run the following instead
# ./bootstrap -DOPENSSL_ROOT_DIR=<location of OpenSSL> # e.g., -DOPENSSL_ROOT_DIR=/
↪usr/local/opt/openssl

# To build the extension
cd build && make

# To install
make install

# Find postgresql.conf
# Then uncomment the shared_preload_libraries line changing it to the following
# shared_preload_libraries = 'timescaledb'
psql -d postgres -c "SHOW config_file;"

# Restart PostgreSQL instance
```

Python Packages

Run these commands as your normal user id.

Change to a virtualenv (using virtualenvwrapper) or do the following as a superuser. A virtualenv is usually better for development. Set the virtualenv to seed.

```
workon seed
```

Make sure PostgreSQL command line scripts are in your PATH (if using MacPorts)

```
export PATH=$PATH:/opt/local/lib/postgresql94/bin
```

Some packages (uWSGI) may need to find your C compiler. Make sure you have 'gcc' on your system, and then also export this to the *CC* environment variable:

```
export CC=gcc
```

Install requirements with *pip*

```
pip install -r requirements/local.txt
```

NodeJS/npm

Install npm. You can do this by installing from nodejs.org, MacPorts, or Homebrew:

MacPorts:

```
sudo port install npm
```

Homebrew:

```
brew install npm
```

Configure Django and Databases

In the *config/settings* directory, there must be a file called *local_untracked.py* that sets up databases and a number of other things. To create and edit this file, start by copying over the template

```
cd config/settings
cp local_untracked.py.dist local_untracked.py
```

Edit *local_untracked.py*. Open the file you created in your favorite editor. The PostgreSQL config section will look something like this:

```
# postgres DB config
DATABASES = {
    'default': {
        'ENGINE': 'django.contrib.gis.db.backends.postgis',
        'NAME': 'seeddb',
        'USER': 'seeduser',
        'PASSWORD': 'seedpass',
        'HOST': 'localhost',
        'PORT': '5432',
    }
}
```

You may want to comment out the AWS settings.

For Redis, edit the *CACHES* and *CELERY_BROKER_URL* values to look like this:

```
CACHES = {
    'default': {
        'BACKEND': 'redis_cache.cache.RedisCache',
        'LOCATION': "127.0.0.1:6379",
        'OPTIONS': {'DB': 1},
        'TIMEOUT': 300
    }
}
CELERY_BROKER_URL = 'redis://127.0.0.1:6379/1'
```

MapQuest API Key

Register for a MapQuest API key: https://developer.mapquest.com/plan_purchase/steps/business_edition/business_edition_free/register

Visit the Manage Keys page: https://developer.mapquest.com/user/me/apps Either create a new key or use the key initially provided. Copy the "Consumer Key" into the target organizations MapQuest API Key field under the organization's settings page or directly within the DB.

Run Django Migrations

Change back to the root of the repository. Now run the migration script to set up the database tables

```
export DJANGO_SETTINGS_MODULE=config.settings.dev
./manage.py migrate
```

Django Admin User

You need a Django admin (super) user.

```
./manage.py create_default_user --username=admin@my.org --organization=seedorg --
↪password=badpass
```

Of course, you need to save this user/password somewhere, since this is what you will use to login to the SEED website.

If you want to do any API testing (and of course you do!), you will need to add an API KEY for this user. You can do this in postgresql directly:

```
psql seeddb seeduser
seeddb=> update landing_seeduser set api_key='DEADBEEF' where id=1;
```

The 'secret' key DEADBEEF is hard-coded into the test scripts.

Install Redis

You need to manually install Redis for Celery to work.

MacPorts:

```
sudo port install redis
```

Homebrew:

```
brew install redis
# follow the post install instructions to add to launchagents or
# call manually with `redis-server`
```

Install JavaScript Dependencies

The JS dependencies are installed using node.js package management (npm).

```
npm install
```

Start the Server

You should put the following statement in ~/.bashrc or add it to the virtualenv post-activation script (e.g., in *~/.virtualenvs/seed/bin/postactivate*).

```
export DJANGO_SETTINGS_MODULE=config.settings.dev
```

The combination of Redis, Celery, and Django have been encapsulated in a single shell script, which examines existing processes and does not start duplicate instances:

```
./bin/start-seed.sh
```

When this script is done, the Django stand-alone server will be running in the foreground.

Login

Open your browser and navigate to http://127.0.0.1:8000

Login with the user/password you created before, e.g., *admin@my.org* and *badpass*.

Note: these steps have been combined into a script called *start-seed.sh*. The script will also not start Celery or Redis if they already seem to be running.

1.1.2 Installation using Docker

Docker works natively on Linux, Mac OSX, and Windows 10. If you are using an older version of Windows (and some older versions of Mac OSX), you will need to install Docker Toolbox.

Choose either *Docker Native (Windows/OSX)* or *Docker Native (Ubuntu)* to install Docker.

Docker Native (Ubuntu)

Follow instructions [here](https://docs.docker.com/engine/installation/linux/docker-ce/ubuntu/).

- [Install Docker Compose](https://docs.docker.com/compose/install/)

Docker Native (Windows/OSX)

Following instructions (for Mac)[https://docs.docker.com/docker-for-mac/install/] or (for Windows)[https://docs.docker.com/docker-for-windows/install/].

- [Install Docker Compose](https://docs.docker.com/compose/install/)

Building and Configuring Containers

- Run Docker Compose

```
docker-compose build
```

Be Patient . . . If the containers build successfully, then start the containers

```
docker volume create --name=seed_pgdata
docker volume create --name=seed_media
docker-compose up
```

Note that you may need to build the containers a couple times for everything to converge

- Login to container

The docker-compose file creates a default user and password. Below are the defaults but can be overridden by setting environment variables.

```
username: user@seed-platform.org
password: super-secret-password
```

Note: Don't forget that you need to reset your default username and password if you are going to use these Docker images in production mode!

CHAPTER

TWO

DEPLOYMENT GUIDE

SEED is intended to be installed on Linux instances in the cloud (e.g. AWS), and on local hardware. SEED Platform does not officially support Windows for production deployment. If this is desired, see the Django notes.

2.1 AWS Setup

Amazon Web Services (AWS) provides the preferred hosting for the SEED Platform.

seed is a Django Project and Django's documentation is an excellent place for general understanding of this project's layout.

2.1.1 Prerequisites

Ubuntu server 14.04 or newer.

```
sudo apt-get update
sudo apt-get upgrade
sudo apt-get install -y libpq-dev python-dev python-pip libatlas-base-dev \
gfortran build-essential g++ npm libxml2-dev libxslt1-dev git mercurial \
libssl-dev libffi-dev curl uwsgi-core uwsgi-plugin-python
```

PostgreSQL and Redis are not included in the above commands. For a quick installation on AWS it is okay to install PostgreSQL and Redis locally on the AWS instance. If a more permanent and scalable solution, it is recommended to use AWS's hosted Redis (ElastiCache) and PostgreSQL service.

Note: postgresql >=9.4 is required to support JSON Type

```
# To install PostgreSQL and Redis locally
sudo apt-get install redis-server
sudo apt-get install postgresql postgresql-contrib
```

Amazon Web Services (AWS) Dependencies

The following AWS services are used for **SEED**:

- RDS (PostgreSQL >=9.4)
- ElastiCache (redis)
- SES

2.1.2 Python Dependencies

Clone the **SEED** repository from **github**

```
$ git clone git@github.com:SEED-platform/seed.git
```

enter the repo and install the python dependencies from requirements

```
$ cd seed
$ sudo pip install -r requirements/local.txt
```

2.1.3 JavaScript Dependencies

`npm` is required to install the JS dependencies.

```
$ sudo apt-get install build-essential
$ sudo apt-get install curl
```

```
$ npm install
```

2.1.4 Database Configuration

Copy the `local_untracked.py.dist` file in the `config/settings` directory to `config/settings/local_untracked.py`, and add a `DATABASES` configuration with your database username, password, host, and port. Your database configuration can point to an AWS RDS instance or a PostgreSQL 9.4 database instance you have manually installed within your infrastructure.

```
# Database
DATABASES = {
    'default': {
        'ENGINE':'django.db.backends.postgresql_psycopg2',
        'NAME': 'seed',
        'USER': '',
        'PASSWORD': '',
        'HOST': '',
        'PORT': '',
    }
}
```

Note: In the above database configuration, `seed` is the database name, this is arbitrary and any valid name can be used as long as the database exists.

create the database within the postgres `psql` shell:

```
CREATE DATABASE seed;
```

or from the command line:

```
createdb seed
```

create the database tables and migrations:

```
python manage.py syncdb
python manage.py migrate
```

create a superuser to access the system

```
$ python manage.py create_default_user --username=demo@example.com --
↪organization=example --password=demo123
```

Note: Every user must be tied to an organization, visit `/app/#/profile/admin` as the superuser to create parent organizations and add users to them.

2.1.5 Cache and Message Broker

The SEED project relies on redis for both cache and message brokering, and is available as an AWS ElastiCache service. `local_untracked.py` should be updated with the `CACHES` and `CELERY_BROKER_URL` settings.

```
CACHES = {
    'default': {
        'BACKEND': 'redis_cache.cache.RedisCache',
        'LOCATION': "seed-core-cache.ntmprk.0001.usw2.cache.amazonaws.com:6379",
        'OPTIONS': { 'DB': 1 },
        'TIMEOUT': 300
    }
}
CELERY_BROKER_URL = 'redis://seed-core-cache.ntmprk.0001.usw2.cache.amazonaws.
↪com:6379/1'
```

2.1.6 Running Celery the Background Task Worker

Celery is used for background tasks (saving data, matching, creating projects, etc) and must be connected to the message broker queue. From the project directory, `celery` can be started:

```
celery -A seed worker -l INFO -c 2 -B --events --maxtasksperchild 1000
```

2.1.7 Running a Production Web Server

The preferred way to deploy with Docker is using docker swarm and docker stack. Look at the deploy.sh script for implementation details.

The short version is to simply run the command below. Note that the passing of the docker-compose.yml filename is not required if using docker-compose.local.yml.

```
`bash ./deploy.sh docker-compose.local.yml `
```

If deploying using a custom docker-compose yml file, then simple replace the name in the command above. This would be required if using the Open Efficiency Platform work (connecting SEED to Salesforce).

2.2 General Linux Setup

While Amazon Web Services (AWS) provides the preferred hosting for SEED, running on a bare-bones Linux server follows a similar setup, replacing the AWS services with their Linux package counterparts, namely: PostgreSQL and Redis.

SEED is a Django project and Django's documentation is an excellent place to general understanding of this project's layout.

2.2.1 Prerequisites

Ubuntu server/desktop 16.04 or newer (18.04 recommended)

Install the following base packages to run SEED:

```
sudo add-apt-repository ppa:timescale/timescaledb-ppa
sudo apt update
sudo apt upgrade
sudo apt install libpq-dev python3-dev python3-pip libatlas-base-dev \
gfortran build-essential nodejs npm libxml2-dev libxslt1-dev git \
libssl-dev libffi-dev curl uwsgi-core uwsgi-plugin-python mercurial
sudo apt install gdal-bin postgis
sudo apt install redis-server
sudo apt install timescaledb-postgresql-10 postgresql-contrib

# For running selenium/protractor
sudo apt install default-jre
```

Note: postgresql >=9.3 is required to support JSON Type

2.2.2 Configure PostgreSQL

Replace 'seeddb', 'seeduser' with desired db/user. By default use password *seedpass* when prompted

```
$ sudo timescaledb-tune
$ sudo service postgresql restart
$ sudo su - postgres
$ createuser -P "seeduser"
$ createdb "seeddb" --owner="seeduser"
$ psql
postgres=# GRANT ALL PRIVILEGES ON DATABASE "seeddb" TO "seeduser";
postgres=# ALTER USER "seeduser" CREATEDB CREATEROLE SUPERUSER;
postgres=# \q
$ exit
```

2.2.3 Python Dependencies

clone the **seed** repository from **github**

```
$ git clone git@github.com:SEED-platform/seed.git
```

enter the repo and install the python dependencies from requirements

```
$ cd seed
$ pip3 install -r requirements/local.txt
```

2.2.4 JavaScript Dependencies

```
$ npm install
```

2.2.5 Django Database Configuration

Copy the `local_untracked.py.dist` file in the `config/settings` directory to `config/settings/local_untracked.py`, and add a `DATABASES` configuration with your database username, password, host, and port. Your database configuration can point to an AWS RDS instance or a PostgreSQL 9.4 database instance you have manually installed within your infrastructure.

```
# Database
DATABASES = {
    'default': {
        'ENGINE': 'django.contrib.gis.db.backends.postgis',
        'NAME': 'seeddb',
        'USER': 'seeduser',
        'PASSWORD': '<PASSWORD>',
        'HOST': 'localhost',
        'PORT': '5432',
    }
}
```

Note: Other databases could be used such as MySQL, but are not supported due to the postgres-specific JSON Type

In in the above database configuration, `seed` is the database name, this is arbitrary and any valid name can be used as long as the database exists. Enter the database name, user, password you set above.

The database settings can be tested using the Django management command, `python3 manage.py dbshell` to connect to the configured database.

create the database tables and migrations:

```
$ python3 manage.py migrate
```

2.2.6 Cache and Message Broker

The SEED project relies on redis for both cache and message brokering, and is available as an AWS ElastiCache service or with the `redis-server` Linux package. (`sudo apt install redis-server`)

`local_untracked.py` should be updated with the `CACHES` and `CELERY_BROKER_URL` settings.

```
CACHES = {
    'default': {
        'BACKEND': 'redis_cache.cache.RedisCache',
        'LOCATION': '127.0.0.1:6379',
        'OPTIONS': {'DB': 1},
        'TIMEOUT': 300
    }
}
CELERY_BROKER_URL = 'redis://127.0.0.1:6379/1'
```

2.2.7 Creating the initial user

create a superuser to access the system

```
$ python3 manage.py create_default_user --username=admin@my.org --organization=lbnl --
↪password=badpass
```

Note: Of course, you need to save this user/password somewhere, since this is what you will use to login to the SEED website.

Every user must be tied to an organization, visit `/app/#/profile/admin` as the superuser to create parent organizations and add users to them.

2.2.8 Running celery the background task worker

Celery is used for background tasks (saving data, matching, creating projects, etc) and must be connected to the message broker queue. From the project directory, `celery` can be started:

```
DJANGO_SETTINGS_MODULE=config.settings.dev celery -A seed worker -l info -c 2 -B --
↪events --maxtasksperchild=1000
```

2.2.9 Running the development web server

The Django dev server (not for production use) can be a quick and easy way to get an instance up and running. The dev server runs by default on port 8000 and can be run on any port. See Django's runserver documentation for more options.

```
$ python3 manage.py runserver --settings=config.settings.dev
```

2.2.10 Running a production web server

Our recommended web server is uwsgi sitting behind nginx. The python package `uwsgi` is needed for this, and should install to `/usr/local/bin/uwsgi` We recommend using `dj-static` to load static files.

Note: The use of the `dev` settings file is production ready, and should be used for non-AWS installs with `DEBUG` set to `False` for production use.

```
$ pip3 install uwsgi dj-static
```

Generate static files:

```
$ python3 manage.py collectstatic --settings=config.settings.prod
```

Update `config/settings/local_untracked.py`:

```
DEBUG = False
# static files
STATIC_ROOT = 'collected_static'
STATIC_URL = '/static/'
```

Start the web server (this also starts celery):

```
$ ./bin/start-seed
```

Warning: Note that uwsgi has port set to `80`. In a production setting, a dedicated web server such as NGINX would be receiving requests on port 80 and passing requests to uwsgi running on a different port, e.g 8000.

2.2.11 Environment Variables

The following environment variables can be set within the `~/.bashrc` file to override default Django settings.

```
export SENTRY_DSN=https://xyz@app.getsentry.com/123
export DEBUG=False
export ONLY_HTTPS=True
```

2.2.12 Mail Services

AWS SES Service

In the AWS setup, we can use SES to provide an email service for Django. The service is configured in the config/settings/local_untracked.py:

```
EMAIL_BACKEND = 'django_ses.SESBackend'
```

In general, the following steps are needed to configure SES:

1. Access Amazon SES Console - Quickstart
2. Login to Amazon SES Console. Verify which region we are using (e.g., us-east-1)
3. Decide on email address that will be sending the emails and add them to the SES Verified Emails.
4. Test that SES works as expected (while in the SES sandbox). Note that you will need to add the sender and recipient emails to the verified emails while in the sandbox.
5. Update the local_untracked.py file or set the environment variables for the docker file.
6. Once ready, move the SES instance out of the sandbox. Following instructions here
7. (Optional) Set up Amazon Simple Notification Service (Amazon SNS) to notify you of bounced emails and other issues.
8. (Optional) Use the AWS Management Console to set up Easy DKIM, which is a way to authenticate your emails. Amazon SES console will have the values for SPF and DKIM that you need to put into your DNS.

SMTP service

Many options for setting up your own SMTP service/server or using other SMTP third party services are available and compatible including gmail. SMTP is not configured for working within Docker at the moment.

```
EMAIL_BACKEND = 'django.core.mail.backends.smtp.EmailBackend'
```

2.2.13 local_untracked.py

```
# PostgreSQL DB config
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.postgresql_psycopg2',
        'NAME': 'seed',
        'USER': 'your-username',
        'PASSWORD': 'your-password',
        'HOST': 'your-host',
        'PORT': 'your-port',
    }
}

# config for local storage backend
DOMAIN_URLCONFS = {'default': 'config.urls'}

CACHES = {
    'default': {
        'BACKEND': 'redis_cache.cache.RedisCache',
```

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```
        'LOCATION': '127.0.0.1:6379',
        'OPTIONS': {'DB': 1},
        'TIMEOUT': 300
    }
}
CELERY_BROKER_URL = 'redis://127.0.0.1:6379/1'

# SMTP config
EMAIL_BACKEND = 'django.core.mail.backends.smtp.EmailBackend'

# static files
STATIC_ROOT = 'collected_static'
STATIC_URL = '/static/'
```

2.3 Migrations

Migrations are handles through Django; however, various versions have customs actions for the migrations. See the migrations page for more information.

2.4 Monitoring

2.4.1 Sentry

Sentry can monitor your webservers for any issues. To enable sentry add the following to your local_untracked.py files after setting up your Sentry account on sentry.io.

The RAVEN_CONFIG is used for the backend and the SENTRY_JS_DSN is used for the frontend. At the moment, it is recommended to setup two sentry projects, one for backend and one for frontend.

```
import raven

RAVEN_CONFIG = {
    'dsn': 'https://<user>:<key>@sentry.io/<job_id>',
    # If you are using git, you can also automatically configure the
    # release based on the git info.
    'release': raven.fetch_git_sha(os.path.abspath(os.curdir)),
}
SENTRY_JS_DSN = 'https://<key>@sentry.io/<job_id>'
```

CHAPTER

THREE

API

3.1 Authentication

Authentication is handled via an encoded authorization token set in a HTTP header. To request an API token, go to `/app/#/profile/developer` and click 'Get a New API Key'.

Authenticate every API request with your username (email, all lowercase) and the API key via Basic Auth. The header is sent in the form of `Authorization: Basic <credentials>`, where credentials is the base64 encoding of the email and key joined by a single colon `:`.

Using Python, use the requests library:

```
import requests

result = requests.get('https://seed-platform.org/api/v2/version/', auth=(user_email,␣
↪api_key))
print result.json()
```

Using curl, pass the username and API key as follows:

```
curl -u user_email:api_key http://seed-platform.org/api/v2/version/
```

If authentication fails, the response's status code will be 302, redirecting the user to `/app/login`.

3.2 Payloads

Many requests require a JSON-encoded payload and parameters in the query string of the url. A frequent requirement is including the organization_id of the org you belong to. For example:

```
curl -u user_email:api_key https://seed-platform.org/api/v2/organizations/12/
```

Or in a JSON payload:

```
curl -u user_email:api_key \
  -d '{"organization_id":6, "role": "viewer"}' \
  https://seed-platform.org/api/v2/users/12/update_role/
```

Using Python:

```
params = {'organization_id': 6, 'role': 'viewer'}
result = requests.post('https://seed-platform.org/api/v2/users/12/update_role/',
                       data=json.dumps(params),
```

(continues on next page)

(continued from previous page)

```
                        auth=(user_email, api_key))
print result.json()
```

3.3 Responses

Responses from all requests will be JSON-encoded objects, as specified in each endpoint's documentation. In the case of an error, most endpoints will return this instead of the expected payload (or an HTTP status code):

```
{
    "status": "error",
    "message": "explanation of the error here"
}
```

3.4 API Endpoints

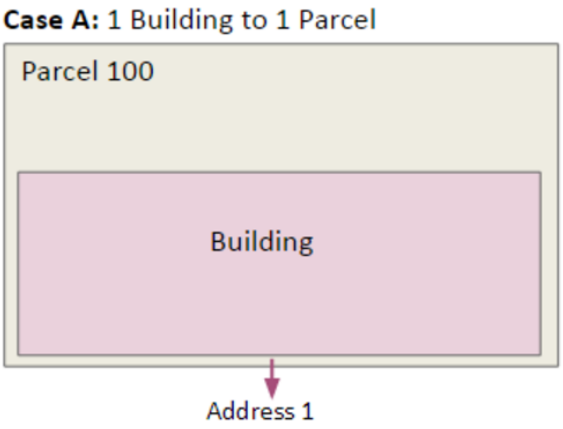
A list of interactive endpoints are available by accessing the API menu item on the left navigation pane within you account on your SEED instance.

To view a list of non-interactive endpoints without an account, view swagger on the development server.

CHAPTER

FOUR

DATA MODEL

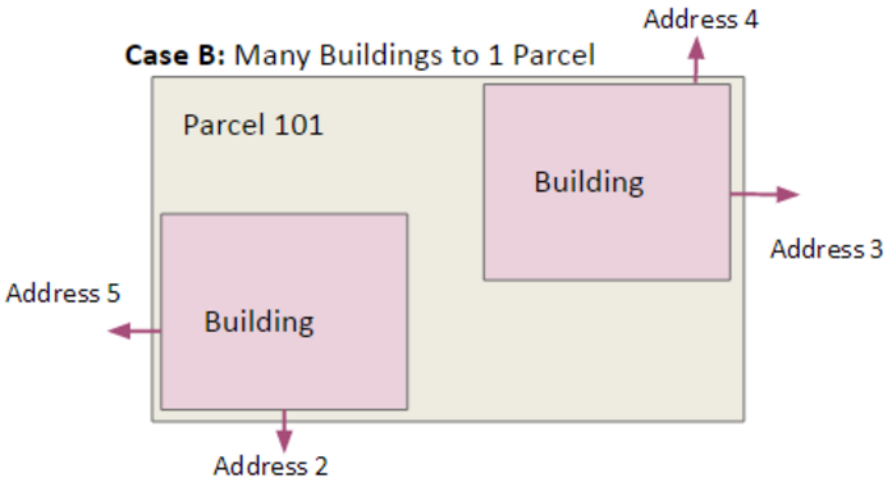


Source Data

Tax Assessor Data One Tax Lot ID per record		
Tax Lot ID	**Address**	**District**
100	44 West 1st	Willow

Building Data	
Building ID	**Tax Lot ID**
30	100

Portfolio Manager Data One PM record associated with one Tax Lot ID or Building ID					
PM ID	**Building ID**	**Tax Lot ID**	**Energy Score**	**EUI**	**Year Ending**
1	30	100	76	15,000	12/31/2015

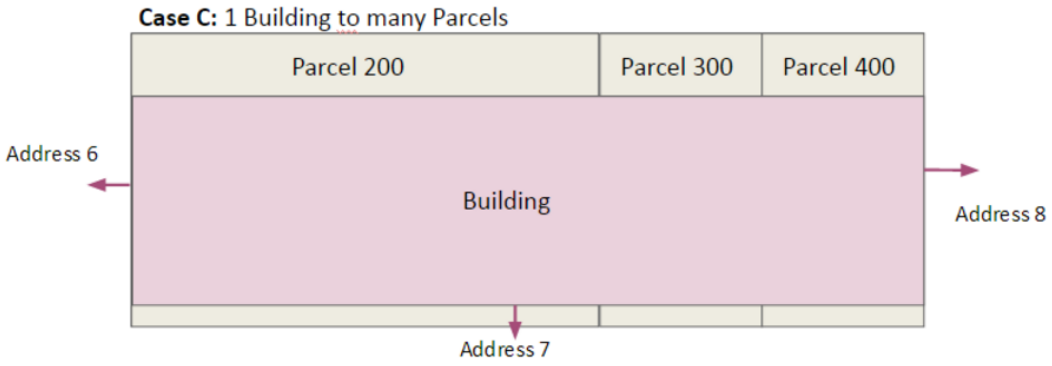


Source Data

Tax Assessor Data One Tax Lot ID per record		
Tax Lot ID	**Address**	**District**
101	15 Broadway	Willow

Building Data	
Building ID	**Tax Lot ID**
101-A	101
101-B	101

Portfolio Manager Data Multiple PM records associated with one Tax Lot ID or Building ID					
PM ID	**Building ID**	**Tax Lot ID**	**Energy Score**	**EUI**	**Year Ending**
2	101-A	101	66	12,000	12/31/2015
3	101-B	101	98	2,500	12/31/2015

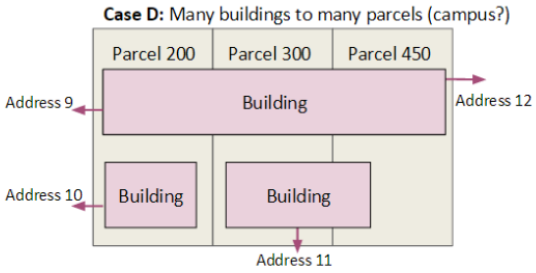


Source Data

Tax Assessor Data One Tax Lot ID per record		
Tax Lot ID	**Address**	**District**
200	1 Adams	Willow
300	2 West	Willow
400	3 Exeter	Willow

Building Data	
Building ID	**Tax Lot ID**
44	200;300;400

Portfolio Manager Data One PM record or Building ID associated with Multiple Tax Lot IDs					
PM ID	**Building ID**	**Tax Lot ID**	**Energy Score**	**EUI**	**Year Ending**
4	44	200;300;400	82	161,000	12/31/2015

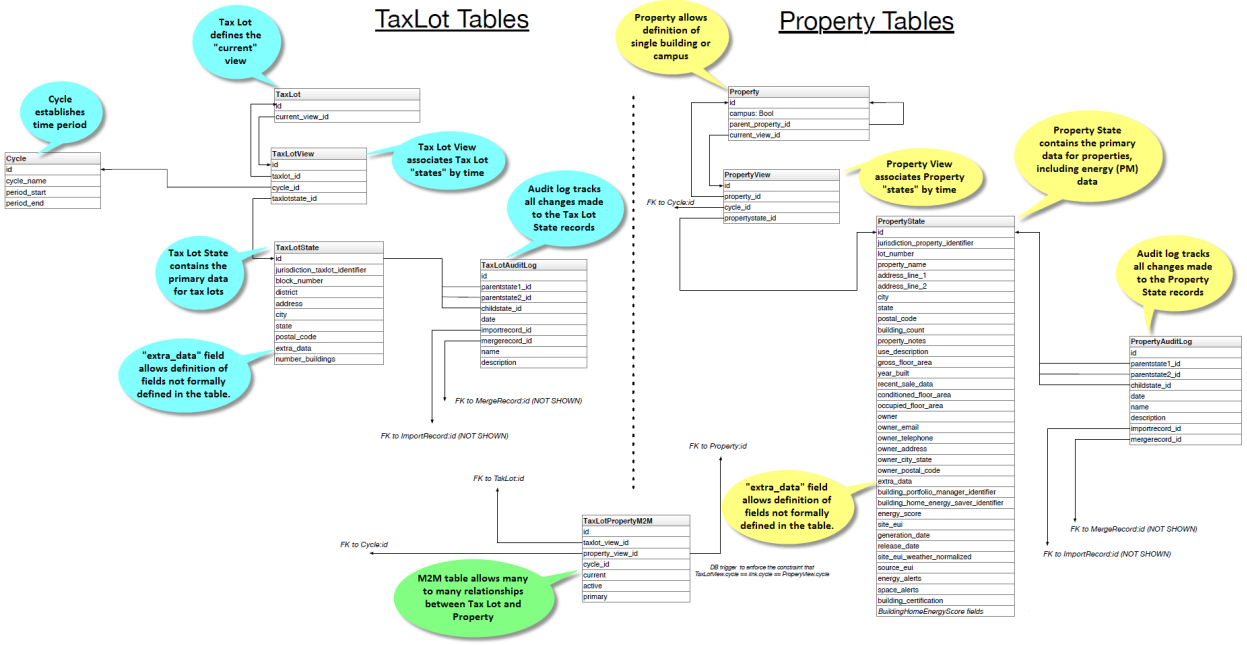


Source Data

Tax Assessor Data One Tax Lot ID per record		
Tax Lot ID	**Address**	**District**
200	1 Adams	Willow
300	2 West	Willow
400	3 Exeter	Willow

Building Data	
Building ID	**Tax Lot ID**
L1	200;300;400
L2	200
L3	300;450

Portfolio Manager Data Hierarchical campus to building: One PM record for campus and multiple PM records for campus buildings related many to many to Tax Lots							
PM ID	**Property Name**	**Parent Name**	**Parent PM ID**	**Tax Lot ID**	**Energy Score**	**EUI**	**Year Ending**
5	Lucky Campus	Lucky Campus	5	200;300;450	--	--	12/31/2013
6	Building 1	Lucky Campus	5	200;300;450	59	107	12/31/2013
7	Building 2	Lucky Campus	5	200	62	268	12/31/2013
8	Building 3	Lucky Campus	5	300;450	74	961	12/31/2013



Todo: Documentation below is out of state and needs updated.

Our primary data model is based on a tree structure with BuildingSnapshot instances as nodes of the tree and the tip of the tree referenced by a CanonicalBuilding.

Take the following example: a user has loaded a CSV file containing information about one building and created the first BuildingSnapshot (BS0). At this point in time, BS0 is linked to the first CanonicalBuilding (CB0), and CB0 is also linked to BS0.

```
BS0 <-- CB0
BS0 --> CB0
```

These relations are represented in the database as foreign keys from the BuildingSnapshot table to the CanonicalBuilding table, and from the CanonicalBuilding table to the BuildingSnapshot table.

The tree structure comes to fruition when a building, BS0 in our case, is matched with a new building, say BS1, enters the system and is auto-matched.

Here BS1 entered the system and was matched with BS0. When a match occurs, a new BuildingSnapshot is created, BS2, with the fields from the existing BuildingSnapshot, BS0, and the new BuildingSnapshot, BS1, merged together. If both the existing and new BuildingSnapshot have data for a given field, the new record's fields are preferred and merged into the child, B3.

The fields from new snapshot are preferred because that is the newer of the two records from the perspective of the system. By preferring the most recent fields this allows for evolving building snapshots over time. For example, if an existing canonical record has a Site EUI value of 75 and some changes happen to a building that cause this to change to 80 the user can submit a new record with that change.

All BuildingSnapshot instances point to a CanonicalBuilding.

```
BS0  BS1
  \ /
  BS2 <-- CB0

BS0 --> CB0
BS1 --> CB0
BS2 --> CB0
```

4.1 parents and children

BuildingSnapshots also have linkage to other BuildingSnapshots in order to keep track of their *parents* and *children*. This is represented in the Django model as a many-to-many relation from BuildingSnapshot to BuildingSnapshot. It is represented in the PostgreSQL database as an additional seed_buildingsnapshot_children table.

In our case here, BS0 and BS1 would both have *children* BS2, and BS2 would have *parents* BS0 and BS1.

Note: throughout most of the application, the `search_buildings` endpoint is used to search or list active building. This is to say, buildings that are pointed to by an active CanonicalBuilding. The `search_mapping_results` endpoint allows the search of buildings regardless of whether the BuildingSnapshot is pointed to by an active CanonicalBuilding or not and this search is needed during the mapping preview and matching sections of the application.

For illustration purposes let's suppose BS2 and a new building BS3 match to form a child BS4.

parent	child
BS0	BS2
BS1	BS2
BS2	BS4
BS3	BS4

And the corresponding tree would look like:

```
BS0  BS1
  \ /
  BS2  BS3
    \  /
     BS4 <-- CB0

BS0 --> CB0
BS1 --> CB0
BS2 --> CB0
BS3 --> CB0
BS4 --> CB0
```

4.1.1 matching

During the auto-matching process, if a *raw* BuildingSnapshot matches an existing BuildingSnapshot instance, then it will point to the existing BuildingSnapshot instance's CanonicalBuilding. In the case where there is no existing BuildingSnapshot to match, a new CanonicalBuilding will be created, as happened to B0 and C0 above.

field	BS0	BS1	BS2 (child)
id1	**11**	11	11
id2		**12**	12
id3	**13**		13
id4	14	**15**	15

4.2 manual-matching vs auto-matching

Since BuildingSnapshots can be manually matched, there is the possibility for two BuildingSnapshots each with an active CanonicalBuilding to match and the system has to choose to move only one CanonicalBuilding to the tip of the tree for the primary BuildingSnapshot and *deactivate* the secondary BuildingSnapshot's CanonicalBuilding.

Take for example:

```
BS0  BS1
  \ /
  BS2  BS3
    \  /
     BS4 <-- CB0 (active: True)          BS5 <-- CB1 (active: True)
```

If a user decides to manually match BS4 and BS5, the system will take the primary BuildingSnapshot's Canonical-Building and have it point to their child and deactivate CB1. The deactivation is handled by setting a field on the CanonicalBuilding instance, *active*, from `True` to `False`.

Here is what the tree would look like after the manual match of **BS4** and **BS5**:

```
BS0  BS1
  \ /
  BS2  BS3
    \  /
     BS4  BS5 <-- CB1 (active: False)
       \  /
        BS6 <-- CB0 (active: True)
```

Even though BS5 is pointed to by a CanonicalBuilding, CB1, BS5 will not be returned by the normal `search_buildings` endpoint because the CanonicalBuilding pointing to it has its field `active` set to `False`.

Note: anytime a match is **unmatched** the system will create a new CanonicalBuilding or set an existing CanonicalBuilding's active field to `True` for any leaf BuildingSnapshot trees.

4.3 what really happens to the BuildingSnapshot table on import (and when)

The above is conceptually what happens but sometimes the devil is in the details. Here is what happens to the BuildingSnapshot table in the database when records are imported.

Every time a record is added at least two BuildingSnapshot records are created.

Consider the following simple record:

Property Id	Year Ending	Property Floor Area	Address 1	Release Date
499045	2000	1234	1 fake st	12/12/2000

The first thing the user is upload the file. When the user sees the "Successful Upload!" dialog one record has been added to the BuildingSnapshot table.

This new record has an id (73700 in this case) and a created and modified timestamp. Then there are a lot of empty fields and a source_type of 0. Then there is the extra_data column which contains the contents of the record in key-value form:

Address 1 "1 fake st"

Property Id "499045"

Year Ending "2000"

Release Date "12/12/2000"

Property Floor Area "1234"

And a corresponding extra_data_sources that looks like

Address 1 73700

Property Id 73700

Year Ending 73700

Release Date 73700

Property Floor Area 73700

All of the fields that look like _source_id are also populated with 73700 E.G. owner_postal_code_source_id.

The other fields of interest are the organization field which is populated with the user's default organization and the import_file_id field which is populated with a reference to a data_importer_importfile record.

At this point the record has been created before the user hits the "Continue to data mapping" button.

The second record (id = 73701) is created by the time the user gets to the screen with the "Save Mappings" button. This second record has the following fields populated:

- id
- created
- modified
- pm_property_id
- year_ending
- gross_floor_area
- address_line_1
- release_date
- source_type (this is 2 instead of 0 as with the other record)
- import_file_id
- organization_id.

That is all. All other fields are empty. In this case that is all that happens.

Now consider the same user uploading a new file from the next year that looks like

Property Id	Year Ending	Property Floor Area	Address 1	Release Date
499045	2000	1234	1 fake st	12/12/2001

As before one new record is created on upload. This has id 73702 and follows the same pattern as 73700. And similarly 73703 is created like 73701 before the "Save Mappings" button appears.

However this time the system was able to make a match with an existing record. After the user clicks the "Confirm mappings & start matching" button a new record is created with ID 73704.

73704 is identical to 73703 (in terms of contents of the BuildingSnapshot table only) with the following exceptions:

- created and modified timestamps are different
- match type is populated and has a value of 1
- confidence is populated and has a value of .9
- source_type is 4 instead of 2
- canonical_building_id is populated with a value
- import_file_id is NULL
- last_modified_by_id is populated with value 2 (This is a key into the landing_seeduser table)
- address_line_1_source_id is 73701
- gross_floor_area_source_id is populated with value 73701
- pm_property_id_source_id is populated with 73701
- release_date_source_id is populated with 73701

- year_ending_source_id is populated with 73701

4.4 what really happens to the CanonicalBuilding table on import (and when)

In addition to the BuildingSnapshot table the CanonicalBuilding table is also updated during the import process. To summarize the above 5 records were created in the BuildingSnapshot table:

1. 73700 is created from the raw 2000 data
2. 73701 is the mapped 2000 data,
3. 73702 is created from the raw 2001 data
4. 73703 is the mapped 2001 data
5. 73704 is the result of merging the 2000 and 2001 data.

In this process CanonicalBuilding is updated twice. First when the 2000 record is imported the CanonicalBuilding gets populated with one new row at the end of the matching step. I.E. when the user sees the "Load More Data" screen. At this point there is a new row that looks like

id	active	canonical_building_id
20505	TRUE	73701

At this point there is one new canonical building and that is the BuildingSnapshot with id 73701. Next the user uploads the 2001 data. When the "Matching Results" screen appears the CanonicalBuilding table has been updated. Now it looks like

id	active	canonical_building_id
20505	TRUE	73704

There is still only one canonical building but now it is the BuildingSnapshot record that is the result of merging the 2000 and 2001 data: id = 73704.

4.5 organization

BuildingSnapshots belong to an Organization field that is a foreign key into the organization model (orgs_organization in Postgres).

Many endpoints filter the buildings based on the organizations the requesting user belongs to. E.G. get_buildings changes which fields are returned based on the requesting user's membership in the BuildingSnapshot's organization.

4.6 *_source_id fields

Any field in the BuildingSnapshot table that is populated with data from a submitted record will have a corresponding _source_id field. E.G pm_property_id has pm_property_id_source_id, address_line_1 has address_line_1_source_id, etc. . .

These are foreign keys into the BuildingSnapshot that is the source of that value. To extend the above table

field	BS0	BS1	BS2 (child)	BS2 (child) _source_id
id1	**11**		11	BS0
id2		**12**	12	BS1

NOTE: The BuildingSnapshot records made from the raw input file have all the _source_id fields populated with that record's ID. The non-canonical BuildingSnapshot records created from the mapped data have none set. The canonical BuildingSnapshot records that are the result of merging two records have only the _source_id fields set where the record itself has data. E.G. in the above address_line_1 is set to "1 fake st." so there is a value in the canonical BuildingSnapshot's address_line_1_source_id field. However there is no block number so block_number_source_id is empty. This is unlike the two raw BuildingSnapshot records who also have no block_number but nevertheless have a block_number_source_id populated.

4.7 extra_data

The BuildingSnapshot model has many "named" fields. Fields like "address_line_1", "year_built", and "pm_property_id". However the users are allowed to submit files with arbitrary fields. Some of those arbitrary fields can be mapped to "named" fields. E.G. "Street Address" can usually be mapped to "Address Line 1". For all the fields that cannot be mapped like that there is the extra_data field.

extra_data is Django json field that serves as key-value storage for other user-submitted fields. As with the other "named" fields there is a corresponding extra_data_sources field that serves the same role as the other _source_id fields. E.G. If a BuildingSnapshot has an extra_data field that looks like

an_unknown_field 1

something_else 2

It should have an extra_data_sources field that looks like

an_unknown_field some_BuildingSnapshot_id

something_else another_BuildingSnapshot_id

4.8 saving and possible data loss

When saving a Property file some fields that are truncated if too long. The following are truncated to 255 characters

- jurisdiction_tax_lot_id
- pm_property_id
- custom_id_1
- ubid
- lot_number
- block_number

- district
- owner
- owner_email
- owner_telephone
- owner_address
- owner_city_state
- owner_postal_code

And the following are truncated to 255:

- property_name
- address_line_1
- address_line_2
- city
- postal_code
- state_province
- building_certification

No truncation happens to any of the fields stored in extra_data.

CHAPTER

FIVE

DATA QUALITY

Data quality checks are run after the data are paired, during import of Properties/TaxLots, or on-demand by selecting rows in the inventory page and clicking the action button. This checks whether any default or user-defined Rules are broken or satisfied by Property/TaxLot records.

Notably, in most cases when data quality checks are run, Labels can be applied for any broken Rules that have a Label. To elaborate, Rules can have an attached Label. When a data quality check is run, records that break one of these "Labeled Rules" are then given that Label. The case where this Label attachment does not happen is during import due to performance reasons.

CHAPTER

SIX

MAPPING

This document describes the set of calls that occur from the web client or API down to the back-end for the process of mapping data into SEED.

An overview of the process is:

1. Import - A file is uploaded to the server
2. Save - The file is batched saved into the database as JSON data
3. Mapping - Mapping occurs on that file
4. Matching / Merging
5. Pairing

6.1 Import

From the web UI, the import process invokes *seed.views.main.save_raw_data* to save the data. When the data is done uploading, we need to know whether it is a Portfolio Manager file, so we can add metadata to the record in the database. The end of the upload happens in *seed.data_importer.views.DataImportBackend.upload_complete*. At this point, the request object has additional attributes for Portfolio Manager files. These are saved in the model *seed.data_importer.models.ImportFile*.

6.2 Mapping

Once files are uploaded, file header columns need to be mapped to SEED columns. Mappings can be specified/decided manually for any particular file import, or mapping presets can be created and subsequently applied to any file imports.

When a column mapping preset is applied to an import file, file header columns defined in the preset must match exactly (spaces, lowercase, uppercase, etc.) in order for the corresponding SEED column information to be used/mapped.

6.3 Matching

Todo: document

6.4 Pairing

Todo: document

CHAPTER

SEVEN

MODULES

7.1 Configuration

7.1.1 Submodules

7.1.2 Template Context

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config.template_context.**sentry_js**(*request*)

config.template_context.**session_key**(*request*)

7.1.3 Tests

7.1.4 Utils

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config.utils.**de_camel_case**(*name*)

7.1.5 Views

7.1.6 WSGI

7.2 Data Package

7.2.1 Submodules

7.2.2 BEDES

7.2.3 Module contents

7.3 Data Importer Package

7.3.1 Submodules

7.3.2 Managers

7.3.3 Models

7.3.4 URLs

7.3.5 Utils

7.3.6 Views

7.3.7 Module contents

7.4 Features Package

7.4.1 Submodules

7.4.2 Module contents

7.5 Landing Package

7.5.1 Subpackages

seed.landing.management package

Subpackages

Landing Management Package

Submodules

Update EULA

Module contents

Module contents

7.5.2 Submodules

7.5.3 Forms

7.5.4 Models

7.5.5 Tests

7.5.6 URLs

7.5.7 Views

7.5.8 Module contents

7.6 Library Packages

7.6.1 Submodules

7.6.2 Module contents

7.7 Mapping Package

7.7.1 Submodules

7.7.2 seed.mappings.mapper module

7.7.3 seed.mappings.seed_mappings module

7.7.4 Module contents

7.8 Managers Package

7.8.1 Subpackages

Manager Tests Package

Submodules

Test JSON Manager

Module contents

7.8.2 Submodules

7.8.3 JSON

7.8.4 Module contents

7.9 Models

7.9.1 Submodules

7.9.2 AuditLog

7.9.3 Columns

7.9.4 Cycles

7.9.5 Joins

7.9.6 Generic Models

7.9.7 Projects

7.9.8 Properties

7.9.9 TaxLots

7.9.10 Module contents

7.10 Public Package

7.10.1 Submodules

7.10.2 Models

7.10.3 Module contents

7.11 SEED Package

7.11.1 Subpackages

Management Package

Subpackages

Utils

7.11.2 Inheritance

7.11.3 Submodules

7.11.4 Decorators

7.11.5 Factory

7.11.6 Models

7.11.7 Search

7.11.8 Tasks

7.11.9 Token Generator

7.11.10 URLs

7.11.11 Utils

7.11.12 Views

7.11.13 Module contents

7.12 Serializers Package

7.12.1 Submodules

7.12.2 Serializers

7.12.3 Labels

7.12.4 Module contents

7.13 URLs Package

7.13.1 Submodules

7.13.2 Accounts

7.13.3 APIs

7.13.4 Main

7.13.5 Projects

7.14 Utilities Package

7.14.1 Submodules

CHAPTER

EIGHT

DEVELOPER RESOURCES

8.1 General Notes

8.1.1 Flake Settings

Flake is used to statically verify code syntax. If the developer is running flake from the command line, they should ignore the following checks in order to emulate the same checks as the CI machine.

Code	Description
E402	module level import not at top of file
E501	line too long (82 characters) or max-line = 100
E731	do not assign a lambda expression, use a def
W503	line break occurred before a binary operator
W504	line break occurred after a binary operator

To run flake locally call:

```
tox -e flake8
```

8.2 Django Notes

8.2.1 Adding New Fields to Database

Adding new fields to SEED can be complicated since SEED has a mix of typed fields (database fields) and extra data fields. Follow the steps below to add new fields to the SEED database:

1. Add the field to the PropertyState or the TaxLotState model. Adding fields to the Property or TaxLot models is more complicated and not documented yet.
2. Add field to list in the following locations:

- models/columns.py: Column.DATABASE_COLUMNS
- TaxLotState.coparent or PropertyState.coparent: SQL query and keep_fields

1. Run *./manage.py makemigrations*
2. Add in a Python script in the new migration to add in the new column into every organizations list of columns. Note that the new_db_fields will be the same as the data in the Column.DATABASE_COLUMNS that were added.

```
def forwards(apps, schema_editor):
    Column = apps.get_model("seed", "Column")
    Organization = apps.get_model("orgs", "Organization")

    new_db_fields = [
        {
            'column_name': 'geocoding_confidence',
            'table_name': 'PropertyState',
            'display_name': 'Geocoding Confidence',
            'data_type': 'number',
        }, {
            'column_name': 'geocoding_confidence',
            'table_name': 'TaxLotState',
            'display_name': 'Geocoding Confidence',
            'data_type': 'number',
        }
    ]

    # Go through all the organizatoins
    for org in Organization.objects.all():
        for new_db_field in new_db_fields:
            columns = Column.objects.filter(
                organization_id=org.id,
                table_name=new_db_field['table_name'],
                column_name=new_db_field['column_name'],
                is_extra_data=False,
            )

            if not columns.count():
                new_db_field['organization_id'] = org.id
                Column.objects.create(**new_db_field)
            elif columns.count() == 1:
                # If the column exists, then just update the display_name␣
↪and data_type if empty
                c = columns.first()
                if c.display_name is None or c.display_name == '':
                    c.display_name = new_db_field['display_name']
                if c.data_type is None or c.data_type == '' or c.data_
↪type == 'None':
                    c.data_type = new_db_field['data_type']
                c.save()
            else:
                print("  More than one column returned")


class Migration(migrations.Migration):
    dependencies = [
        ('seed', '0090_auto_20180425_1154'),
    ]

    operations = [
        ... existing db migrations ...,
        migrations.RunPython(forwards),
    ]
```

3. Run migrations *./manage.py migrate*
4. Run unit tests, fix failures. Below is a list of files that need to be fixed (this is not an exhaustive list)

- test_mapping_data.py:test_keys
- test_columns.py:test_column_retrieve_schema
- test_columns.py:test_column_retrieve_db_fields

1. (Optional) Update example files to include new fields
2. Test import workflow with mapping to new fields

8.3 AngularJS Integration Notes

8.3.1 Template Tags

Angular and Django both use *{{* and *}}* as variable delimiters, and thus the AngularJS variable delimiters are renamed *{$* and *$}*.

```
window.BE.apps.seed = angular.module('BE.seed', ['$interpolateProvider'], function (
↪$interpolateProvider) {
        $interpolateProvider.startSymbol("{$");
        $interpolateProvider.endSymbol("$}");
    }
);
```

8.3.2 Django CSRF Token and AJAX Requests

For ease of making angular *$http* requests, we automatically add the CSRF token to all *$http* requests as recommended by http://django-angular.readthedocs.io/en/latest/integration.html#xmlhttprequest

```
window.BE.apps.seed.run(function ($http, $cookies) {
    $http.defaults.headers.common['X-CSRFToken'] = $cookies['csrftoken'];
});
```

8.3.3 Routes and Partials or Views

Routes in *static/seed/js/seed.js* (the normal angularjs *app.js*)

```
SEED_app.config(['stateHelperProvider', '$urlRouterProvider', '$locationProvider',␣
↪function (stateHelperProvider, $urlRouterProvider, $locationProvider) {
  stateHelperProvider
    .state({
      name: 'home',
      url: '/',
      templateUrl: static_url + 'seed/partials/home.html'
    })
    .state({
      name: 'profile',
      url: '/profile',
      templateUrl: static_url + 'seed/partials/profile.html',
      controller: 'profile_controller',
      resolve: {
        auth_payload: ['auth_service', '$q', 'user_service', function (auth_service,
↪$q, user_service) {
```

(continues on next page)

(continued from previous page)

```
          var organization_id = user_service.get_organization().id;
          return auth_service.is_authorized(organization_id, ['requires_superuser']);
        }],
        user_profile_payload: ['user_service', function (user_service) {
          return user_service.get_user_profile();
        }]
      }
    });
}]);
```

HTML partials in *static/seed/partials/*

8.4 Logging

Information about error logging can be found here - https://docs.djangoproject.com/en/1.7/topics/logging/

Below is a standard set of error messages from Django.

A logger is configured to have a log level. This log level describes the severity of the messages that the logger will handle. Python defines the following log levels:

```
DEBUG: Low level system information for debugging purposes
INFO: General system information
WARNING: Information describing a minor problem that has occurred.
ERROR: Information describing a major problem that has occurred.
CRITICAL: Information describing a critical problem that has occurred.
```

Each message that is written to the logger is a Log Record. The log record is stored in the web server & Celery

8.5 BEDES Compliance and Managing Columns

Columns that do not represent hardcoded fields in the application are represented using a Django database model defined in the seed.models module. The goal of adding new columns to the database is to create seed.models.Column records in the database for each column to import. Currently, the list of Columns is dynamically populated by importing data.

There are default mappings for ESPM are located here:

> https://github.com/SEED-platform/seed/blob/develop/seed/lib/mappings/data/pm-mapping.json

8.6 Resetting the Database

This is a brief description of how to drop and re-create the database for the seed application.

The first two commands below are commands distributed with the Postgres database, and are not part of the seed application. The third command below will create the required database tables for seed and setup initial data that the application expects (initial columns for BEDES). The last command below (spanning multiple lines) will create a new superuser and organization that you can use to login to the application, and from there create any other users or organizations that you require.

Below are the commands for resetting the database and creating a new user:

```
psql -c 'DROP DATABASE "seeddb"'
psql -c 'CREATE DATABASE "seeddb" WITH OWNER = "seeduser";'
psql -c 'GRANT ALL PRIVILEGES ON DATABASE "seeddb" TO seeduser;'
psql -c 'ALTER ROLE seeduser SUPERUSER;
psql -d seeddb -c "CREATE EXTENSION postgis;"
./manage.py migrate
./manage.py create_default_user \
    --username=demo@seed-platform.org \
    --password=password \
    --organization=testorg
```

8.7 Migrating the Database

Migrations are handles through Django; however, various versions have customs actions for the migrations. See the migrations page for more information based on the version of SEED.

8.8 Testing

JS tests can be run with Jasmine at the url */angular_js_tests/*.

Python unit tests are run with

```
python manage.py test --settings=config.settings.test
```

Note on geocode-related testing: Most of these tests use VCR.py and cassettes to capture and reuse recordings of HTTP requests and responses. Given that, unless you want to make changes and/or refresh the cassettes/recordings, there isn't anything needed to run the geocode tests.

In the case that the geocoding logic/code is changed or you'd like to the verify the MapQuest API is still working as expected, you'll need to run the tests with a small change. Namely, you'll want to provide the tests with an API key via an environment variable called "TESTING_MAPQUEST_API_KEY" or within your local_untracked.py file with that same variable name.

In order to refresh the actual cassettes, you'll just need to delete or move the old ones which can be found at ".seed/tests/data/vcr_cassettes". The API key should be hidden within the cassettes, so these new cassettes can and should be pushed to GitHub.

Run coverage using

```
coverage run manage.py test --settings=config.settings.test
coverage report --fail-under=83
```

Python compliance uses PEP8 with flake8

```
flake8
# or
tox -e flake8
```

JS Compliance uses jshint

```
jshint seed/static/seed/js
```

8.9 Best Practices

1. Make sure there is an issue created for items you are working on (for tracking purposes and so that the item appears in the changelog for the release)
2. **Use the following labels on the GitHub issue: Feature** (features will appear as "New" item in the changelog) **Enhancement** (these will appear as "Improved" in the changelog) **Bug** (these will appear as "Fixed" in the changelog)
3. Move the ticket/issue to 'In Progress' in the GitHub project tracker when you begin work
4. Branch off of the 'develop' branch (unless it's a hotfix for production)
5. Write a test for the code added.
6. Make sure to test locally. note that all branches created and pushed to GitHub will also be tested automatically.
7. When done, create a pull request (you can group related issues together in the same PR). Assign a reviewer to look over the code
8. Use the "DO NOT MERGE" label for Pull Requests that should not be merged
9. When PR has been reviewed and approved, move the ticket/issue to the 'Ready to Deploy to Dev' box in the GitHub project tracker.

8.10 Release Instructions

To make a release do the following:

1. Github admin user, on develop branch: update the `package.json` file with the most recent version number. Always use MAJOR.MINOR.RELEASE.
2. Update the `docs/sources/migrations.rst` file with any required actions.
3. Run the `docs/scripts/change_log.py` script and add the changes to the CHANGELOG.md file for the range of time between last release and this release. Only add the *Closed Issues*. Also make sure that all the pull requests have a related Issue in order to be included in the change log.

```
python docs/scripts/change_log.py -k GITHUB_API_TOKEN -s 2018-02-26 -e 2018-05-30
```

4. Paste the results (remove unneeded Accepted Pull Requests) into the CHANGELOG.md. Make sure to cleanup the formatting.
5. Make sure that any new UI needing localization has been tagged for translation, and that any new translation keys exist in the lokalise.com project. (see translation documentation).
6. Once develop passes, then create a new PR from develop to master.
7. Draft new Release from Github (https://github.com/SEED-platform/seed/releases).
8. Include list of changes since previous release (i.e. the content in the CHANGELOG.md)
9. Verify that the Docker versions are built and pushed to Docker hub (https://hub.docker.com/r/seedplatform/seed/tags/).
10. Go to Read the Docs and enable the latest version to be active (https://readthedocs.org/dashboard/seed-platform/versions/)

CHAPTER

NINE

LICENSE

CHAPTER

TEN

HELP

10.1 For SEED-Platform Users

Please visit our User Support website for tutorials and documentation to help you learn how to use SEED-Platform.

https://sites.google.com/a/lbl.gov/seed/

There is also a link to the SEED-Platform Users forum, where you can connect with other users.

https://groups.google.com/forum/#!forum/seed-platform-users

For direct help on a specific problem, please email: SEED-Support@lists.lbl.gov

10.2 For SEED-Platform Developers

The Open Source code is available on the Github organization SEED-Platform:

https://github.com/SEED-platform

Please join the SEED-Platform Dev forum where you can connect with other developers.

https://groups.google.com/forum/#!forum/seed-platform-dev

CHAPTER

ELEVEN

FREQUENTLY ASKED QUESTIONS

Here are some frequently asked questions and/or issues.

11.1 Questions

11.1.1 What is the SEED Platform?

The Standard Energy Efficiency Data (SEED) Platform™ is a web-based application that helps organizations easily manage data on the energy performance of large groups of buildings. Users can combine data from multiple sources, clean and validate it, and share the information with others. The software application provides an easy, flexible, and cost-effective method to improve the quality and availability of data to help demonstrate the economic and environmental benefits of energy efficiency, to implement programs, and to target investment activity.

The SEED application is written in Python/Django, with AngularJS, Bootstrap, and other JavaScript libraries used for the front-end. The back-end database is required to be PostgreSQL.

The SEED web application provides both a browser-based interface for users to upload and manage their building data, as well as a full set of APIs that app developers can use to access these same data management functions.

Work on SEED Platform is managed by the National Renewable Energy Laboratory, with funding from the U.S. Department of Energy.

11.2 Issues

11.2.1 Why is the domain set to example.com?

If you see example.com in the emails that are sent from your hosted version of SEED then you will need to update your django sites object in the database.

```
$ ./manage.py shell

from django.contrib.sites.models import Site
one = Site.objects.all()[0]
one.domain = 'newdomain.org'
one.name = 'SEED'
one.save()
```

11.2.2 Why aren't the static assets being served correctly?

Make sure that your local_untracked.py file does not have STATICFILES_STORAGE set to anything. If so, then comment out that section and redeploy/recollect/compress your static assets.

CHAPTER

TWELVE

UPDATING THIS DOCUMENTATION

This python code documentation was generated by running the following:

```
$ pip install -r requirements/local.txt
$ sphinx-apidoc -o docs/source/modules . seed/lib/mcm seed/lib/superperms
$ cd docs
$ make html
```

CHAPTER

THIRTEEN

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