1 - Installation guide

> For best results please follow this guide closely. All `bolded, dark-grey text` is meant to highlight something you will have to type or copy/paste into your terminal.

> **What are you making me install?:**
> The only thing this setup will install onto your system **directly** are Python 3, pip for Python3, and PostgreSQL (if you do not already have them). All other dependencies such as Django and the packages used by Stegasaurus will be installed in a Python Virtual Environment and will not be polluting your global machine space.

> **Mac OSX** - Click here to view these steps in the github wiki
>> **1 - Prerequisites** (Required before you can do anything else!)
>> Python 3.0 or newer: https://www.python.org/downloads/

>> PostgreSQL
>>> **1.1 -** Download the zip from http://postgresapp.com/.
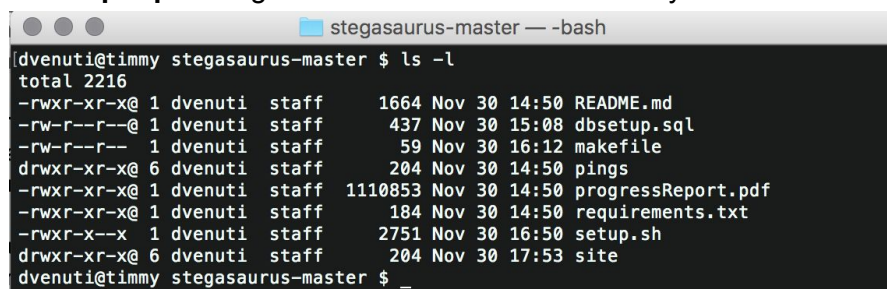>>> Unzip it, and move the PostgreSQL app into your Applications folder.

>>> **1.2 -** For the setup script in the next step to be able to access psql from the terminal, you must add PostgreSQL to your path. To do so, open a terminal and execute the following command (*it is one long command which this document wraps so just copy paste the entire command into your terminal*):

>>> `echo 'export PATH=$PATH:/Applications/Postgres.app/Contents/Versions/latest/bin' >> ~/.bash_profile`

>>> **1.3 -** After executing this command, exit out all terminal windows. We do this to ensure that the next time we open a terminal window, bash shell is updated with the PostgreSQL addition so that we can successfully execute the setup script.

>> **2 - Set up and Build Stegasaurus (Only needs to be done once, the first time.)**
>>> **2.1 -** Open a terminal window and move into the Stegasaurus directory you unzipped using `cd` followed by the path where that directory is. If you were to type `ls -l` into the terminal you should see this document as well as **setup.sh** and **dbsetup.sql** among other files and the site directory.

```
[dvenuti@timmy stegasaurus-master $ ls -l
total 2216
-rwxr-xr-x@ 1 dvenuti  staff     1664 Nov 30 14:50 README.md
-rw-r--r--@ 1 dvenuti  staff      437 Nov 30 15:08 dbsetup.sql
-rw-r--r--  1 dvenuti  staff       59 Nov 30 16:12 makefile
drwxr-xr-x  6 dvenuti  staff      204 Nov 30 14:50 pings
-rwxr-xr-x@ 1 dvenuti  staff  1110853 Nov 30 14:50 progressReport.pdf
-rwxr-xr-x@ 1 dvenuti  staff      184 Nov 30 14:50 requirements.txt
-rwxr-x--x  1 dvenuti  staff     2751 Nov 30 16:50 setup.sh
drwxr-xr-x  6 dvenuti  staff      204 Nov 30 17:53 site
dvenuti@timmy stegasaurus-master $ _
```

2.2 - Make sure **setup.sh** has executable privileges on your machine. You can check by doing `ls -l` and looking at the letters in the far left column next for setup.sh. If you see **-rwxr-x--x** the file is executable. If you do not see this, type `chmod 751 setup.sh` into your terminal. This will guarantee that you can execute the setup script by giving it executable privileges.

2.3 - Run the setup script by typing `./setup.sh` into your terminal window and let it run. This script will completely set up a local environment within that same directory along with all of the dependencies needed to run this site (within a virtual environment) so that you can run it on your machine.

You will be prompted at one point to create an admin username, email, and password before the script can finish. This will allow you to log into the admin side of the Stegasaurus site. This prompt will look something like this:

```
stegasaurus-master — python3 ‹ setup.sh
  Applying auth.0002_alter_permission_name_max_length... OK
  Applying auth.0003_alter_user_email_max_length... OK
  Applying auth.0004_alter_user_username_opts... OK
  Applying auth.0005_alter_user_last_login_null... OK
  Applying auth.0006_require_contenttypes_0002... OK
  Applying auth.0007_alter_validators_add_error_messages... OK
  Applying auth.0008_alter_user_username_max_length... OK
  Applying main.0001_initial... OK
  Applying sessions.0001_initial... OK
Operations to perform:
  Apply all migrations: main
Running migrations:
  No migrations to apply.
*
*
*CREATING SUPERUSER FOR ADMIN USE*
Username (leave blank to use 'dvenuti'): admin
Email address: admin@steg.com
Password:
```
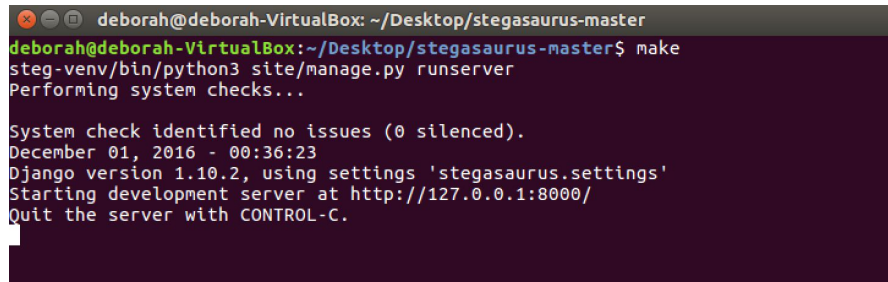
When the script is done, you should see something like this in your terminal:

```
*SETUP COMPLETE*
TO LAUNCH STEGASAURUS TYPE make AND OPEN http://127.0.0.1:8000 IN ANY BROWSER
```

3 - Run Stegasaurus

To run Stegasaurus, make sure you are still in that same directory as before. If you do `ls -l` again, you should see all the same files including a **makefile**.

Type `make` into your terminal to run Stegasaurus. When the site server is running successfully, you should see something like this:

```
stegasaurus-master — python3 ‹ make
dvenuti@timmy stegasaurus-master $ make
steg-venv/bin/python3 site/manage.py runserver
Performing system checks...

System check identified no issues (0 silenced).
November 30, 2016 - 23:48:55
Django version 1.10.2, using settings 'stegasaurus.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

Open any browser window and type `http://127.0.0.1:8000` into the URL bar to get

to the site. If all went well, you should see the Stegasaurus home page.

Windows - [Click here to view these steps in the github wiki](#)

1 - Install a Virtual Machine

Windows users cannot run the server from a Windows host. They must install a virtual machine so that they can run the server from a Linux host. [Oracle VM VirtualBox](#) was used by our team.

2 - Setup Linux Image on Virtual Machine

Go to the Ubuntu [download page](#) and download the image for version 16.04.1 LTS.

Open VirtualBox and select the New button.

Name your virtual machine, select Type as Linux, and Version as Ubuntu 64 bit (or 32 bit depending on your machine) and then click next.

Select your memory size. At least 2 GB is recommended for machine to not lag. Click next.

Select create a virtual hard disk, and click Create.

Select a hard disk file type, and select create. Select whether you want to dynamically allocate the storage or not.The recommended 8.00 GB of space is fine for the purposes of running this site.

Click Create and your machine will show up on the left side of your VirtualBox Manager. Select your VM and press click Start. You will be prompted to select a start-up disk. Navigate to where you downloaded the .iso file if it is not already selected and click open. Then click Start. The disk will boot into a live version. Select install Ubuntu, and follow the on-screen installation instructions.

3 - Follow the Linux Instructions.

Now that you have a virtual machine installed, from within the virtual machine, all of the instructions will be identical to those of the Unix/Linux instructions below.

Unix/Linux - [Click here to view these steps in the github wiki](#)

These instructions are specific to Ubuntu 16.04.1 LTS, but they should work on other Debian derived systems.

1 - Prerequisites (Required before you can do anything else!)

Python 3.0 or newer: https://www.python.org/downloads/

2 - Set up and Build Stegasaurus (Only needs to be done once, the first time.)

2.1 - Open a terminal window and move into the Stegasaurus directory you unzipped using `cd` followed by the path where that directory is. If you were to type

ls -l into the terminal you should see this document as well as **setup.sh** and **dbsetup.sql** among other files and the site directory. If you see something similar to this, you are in the right spot.

2.2 - Make sure **setup.sh** has executable privileges on your machine. You can check by doing **ls -l** and looking at the letters in the far left column next for setup.sh. If you see **-rwxr-x--x** the file is executable. If you do not see this, type **chmod 751 setup.sh** into your terminal. This will guarantee that you can execute the setup script by giving it executable privileges.

2.3 - Run the setup script by typing **./setup.sh** into your terminal window and let it run. This script will completely set up a local environment within that same directory along with installing PostgreSQL and all of the dependencies needed to run this site (within a virtual environment) so that you can run it on your machine.

You will be prompted at one point to create an admin username, email, and password before the script can finish. This will allow you to log into the admin side of the Stegasaurus site. This prompt will look something like this:

When the script is done, you should see something like this in your terminal:

3 - Run Stegasaurus
To run Stegasaurus, make sure you are still in that same directory as before. If you do **ls -l** again, you should see all the same files including a **makefile**.

Type `make` into your terminal to run Stegasaurus. When the site server is running successfully, you should see something like this:

```
deborah@deborah-VirtualBox: ~/Desktop/stegasaurus-master
deborah@deborah-VirtualBox:~/Desktop/stegasaurus-master$ make
steg-venv/bin/python3 site/manage.py runserver
Performing system checks...

System check identified no issues (0 silenced).
December 01, 2016 - 00:36:23
Django version 1.10.2, using settings 'stegasaurus.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

Open any browser window and type http://127.0.0.1:8000 into the URL bar to get to the site. If all went well, you should see the Stegasaurus home page.

2 - Brief Functionality Description

Stegasaurus is a web-based image steganography tool. Here users can encrypt images and text into a larger image file as well as decrypt images which have already had images or text encrypted into them.
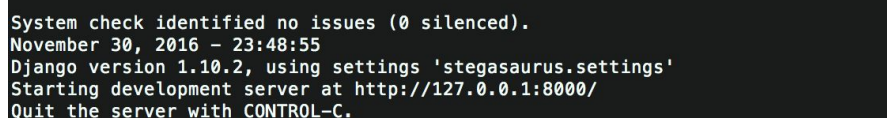
The uploaded images and strings of text are processed into arrays of bytes. The bits comprising the bytes of the smaller image or text are then used to sequentially replace the least significant bits of the larger image's bytes. Because only the least significant bits are modified in the larger picture, the result is that the larger picture looks unchanged when the process is completed.

If a Stegasaurus user wishes to decrypt an image previously encrypted with Stegasaurus, they can upload their image at the Decrypt page and choose whether they are decrypting an image or text. The image is processed into an array of bytes. The least significant bits or each byte are sequentially copied into the bytes of another array which is then processed into an image or string of text depending on the user's selection at the Decrypt page.

3 - Brief Tutorial On How To Use Stegasaurus

3.1 - Run Site (Requires setup from section 1 of this document as a prerequisite)

In a terminal, in the directory of the zip you downloaded for Stegasaurus. Type `make` into your terminal to run Stegasaurus. You should see this if successful:

```
System check identified no issues (0 silenced).
November 30, 2016 — 23:48:55
Django version 1.10.2, using settings 'stegasaurus.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL—C.
```

Open any browser window and type http://127.0.0.1:8000 into the URL bar to get to the site.

3.2 - User Registration, User Login and Admin Access

3.2.1 - Register

When on the Stegasaurus home page, in the upper right hand corner there is a button which says **Register**. Click it to be brought to the **Register** page. Fill out the appropriate fields, and then click the **Register** button below. If you entered appropriate information you will be brought to the **Sign In** page. Fill out the fields with what you entered while registering, and then click the **Sign In** button below to be brought to your **Profile** page.

On your **Profile** page there are two buttons: **Details**, and **Archive**. If you click on **Details** you can view the email address you used to register, as well as an option to reset your password. If you click on **Archive** you can see a history of files that you have encrypted and/or decrypted.

3.2.2 - Admin Page

To access the admin part of the stegasaurus site, you must navigate in your browser to **https://127.0.0.1:8000/admin**. Enter the superuser username and password you created while setting up the site to login as an admin.

On the **Admin** page, there are two links: **Groups**, and **Users**. Groups can be added and changed. Users can be added or changed. To add a group, click on the link **Add** to the right of **Group** to add a group and grant privileges. To add a user, click on the link **Add** to the right of **User**. If you click on the link **User** you can see a list of Stegasaurus users. By clicking on a user, their profile and privileges can be edited.

3.3 - Encryption

On the **Encrypt** page there are two buttons: **Encrypt File**, and **Encrypt Text**.
If you click on **Encrypt File** you will see two upload forms to upload a carrier file and data files. A carrier file is the larger image which you wish to encrypt files or text into with steganography. The data files are the images which you wish to encrypt into the carrier file. The number of bytes which the data file takes up should be no more than ¼ the number of pixels in the carrier image. Once you upload the files you wish to use, click the **Submit** button.

If you click on **Encrypt Text** you will be prompted to upload a carrier file and enter the text which you wish to encrypt into the carrier file. Once finished, click the **Submit** button.

When the encryption is completed you will be redirected to your **Profile Archive** where you can see the completed encryption. If you click the url in the archive it will open the encrypted image so that you can save it locally.

3.4 Decryption

On the **Decrypt** page, you will be prompted to upload a carrier file and select whether you are decrypting text or a file. **You must upload a file which you know was encrypted with Stegasaurus.** You must also know whether an image or text was encrypted into the carrier file, and select the appropriate option for the prompt. Click the **Submit** button.

When the decryption is completed, you will be redirected to your **Profile Archive** where you can see the completed decryption. If you click the url in the archive it will download a tar file containing everything that was extracted from the image. If you were decrypting text, the text will display below the **Submit** button on the **Decrypt** page.

4 - Handled Inputs

File Types

Stegasaurus currently only works with .png images.

Decyption

Stegasaurus is currently incapable of detecting and responding to whether an image was encrypted on the site. Due to this limitation, when choosing a file to decrypt, you must choose a file which you know was encrypted with Stegasaurus. You must also know whether text or data files were encrypted into the carrier image, and select the appropriate option for decryption.

Password Reset

Since our site is not live, we do not have a server setup that we can use to actually send an email to an individual's email account. This is the wiki page that addresses the code I have implemented to add the reset password functionality while working around these issues.

When trying to reset your password, you should have two terminal windows open. The first terminal window is what you will use to run the site by running the command **make**. In the other terminal window, also navigate to the 'site' directory. Run this command in the command line: **python -m smtpd -n -c DebuggingServer localhost:1025**. This is the command that allows you to use the Terminal window to receive the message.

Once that is done, proceed to the site. Go to the settings tab of profile and click the **Reset Password** button. Enter your email and submit the information. The site should load a message saying it sent you an email. This is obviously not the case, but we wanted to show the site as it would be if it were live. The email will appear in the second terminal window you set up. Copy and paste the link in the terminal window "email" into your browser and proceed to reset your password. Everything from that point on should work as expected.