Final Report

Team Iota : WEB3_Recognition

Daniel Bonnin, Onur Ozay, Tanna Richardson

Introduction

Our team developed an employee recognition website that can be used within a company for employees to recognize their peers by granting awards. The website includes two primary components: 1) a user side where employees can create awards and view, print, and download awards that they have received, and 2) an admin side where administrator-level employees can manage user accounts and generate reports to monitor award activity.

This document describes the final software system and provides instructions for use. It includes the following:
- Program Description
- Usage Instructions
- Software and Systems
- Development Environment
- Team Member Accomplishments

The project can be accessed at the following URL:
http://teamiota-dev.us-west-2.elasticbeanstalk.com/

Program Description

This section provides an overview of the major features available in the program.

Authentication

The Admin and User Portal share a common authentication system. In order to gain access to either portal, users must enter a valid email address and password. The program will determine if the user is a normal or admin user and redirect them to the appropriate portal.

The login page also allows users to reset a forgotten password. Users can click on a Reset Password link and enter their email address. The application will send an email that includes a link to a password reset form, which allows the user to enter a new password.

Admin Portal

The Admin Portal allows admin users to manage user accounts and generate reports to analyze awards. It includes the following key features:

Add Users

Admin users can create new user accounts that include the following settings:

- Username
- Password
- Email address (used for login, must be unique)
- First name
- Last name
- Location (select from list)
- Department (select from list)
- Admin (checkbox)

Edit Users

Admin users can enter an email address to search for a user and edit their settings. All settings from the Add Users list above can be edited, with the exception of email address and password.

List Users / Delete

Admin users can view a list of all users currently in the system. The list is displayed in table format and includes the following columns:

- Name (nickname)
- Location
- Department
- Account Type (user or admin)
- Edit (button to go to edit form; same form as Edit Users above)
- Delete (button to delete user after confirmation)

Generate Reports

Admin users can track award activity through predefined and custom reports. The following predefined reports can be selected by the admin user:

- Awards by Type
- Awards by Department
- Awards by Location
- Awards this Month
- Awards this Year
- Awards All Time
- Awards Given by User
- Awards Given by User

In addition, admin users can generate custom reports by applying any of the following filters:

- Award Type - select type from list
- Awarded Date - specify start and end date
- Awarded By - select user, department, and/or location from list
- Awarded To - select user, department, and/or location from list

Each report includes the following content:
- Summary table providing totals relevant to the selected report
- Summary chart providing a visual summary relevant to the selected report (not available for custom reports)
- Details table providing raw award data for all awards matching report criteria
  - Includes Award Type, Date, Awarded By, Awarded To, Department, Location
  - Columns are sorted based on the selected report, but users can click arrows in any of the column headings to re-sort, in ascending or descending order
  - Table supports pagination and allows the user to select the number of entries to display per page
- Export Data button that downloads the contents of the details table in CSV format

User Portal

The User Portal allows normal users to view awards they have received and create and revoke awards for other users. It includes the following key features:

Add Signature Image
Award certificates include a signature image from the user who granted the award. Users can create their signature by uploading an image file or drawing a signature in their browser.

**View / Manage Received Awards**
The User Portal home page displays thumbnails of all awards the user has received, organized by award type (known as the Awards Grid). Users can click on a thumbnail to open the details view, which provides a larger image and has options to Print Certificate and Save PDF.

Create Award
Users can grant awards to other users with the following options:
- Awardee (select user's email from list)
- Award Type (select from list)
- Date of Award (may be past, present or future; selected using datepicker)

When the award is created, the program generates a PDF certificate and emails it to the recipient as an attachment. In addition, the award will appear on the recipient's home page in their Awards Grid.
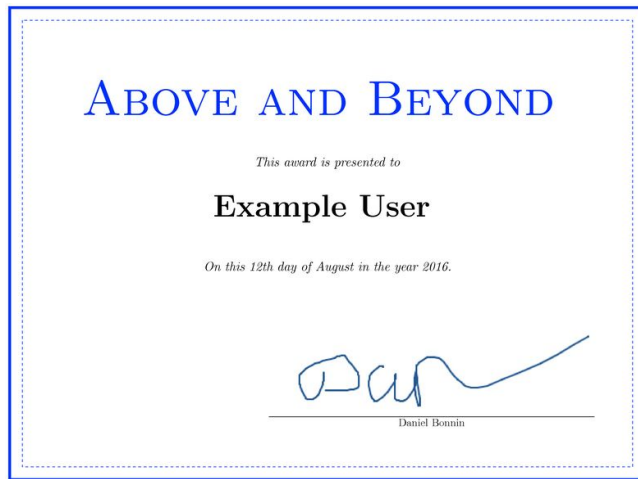
Revoke Awards
Users can also revoke awards they have previously granted. The Revoke Awards button on the user's home page removes ALL awards the current user has created for all other users. A confirmation message is shown before deletion.

Usage Instructions

This section provides instructions for using each of the major features included in the final project. The project can be accessed at: http://teamiota-dev.us-west-2.elasticbeanstalk.com/

To aid testing, the project is pre-populated with the following user accounts:

| Email	User Type
teamosuiota@gmail.com	Admin
danielsbonnin@gmail.com	User
ozayo@oregonstate.edu	User
tanna.richardson@gmail.com	User

** All accounts have the password "iota419"

Login

To use the Admin or User Portal you must first login. This step is a prerequisite for all of the tasks below.

1. Go to: http://teamiota-dev.us-west-2.elasticbeanstalk.com/
2. Enter a valid email address and password and click the **Login** button.
3. The credentials are authenticated and if correct, the appropriate portal is displayed.

Admin Portal

The Admin Portal allows you to add, edit, and delete user accounts and track award activity. The screenshot below shows the Admin Portal home page and provides an overview of the major components.
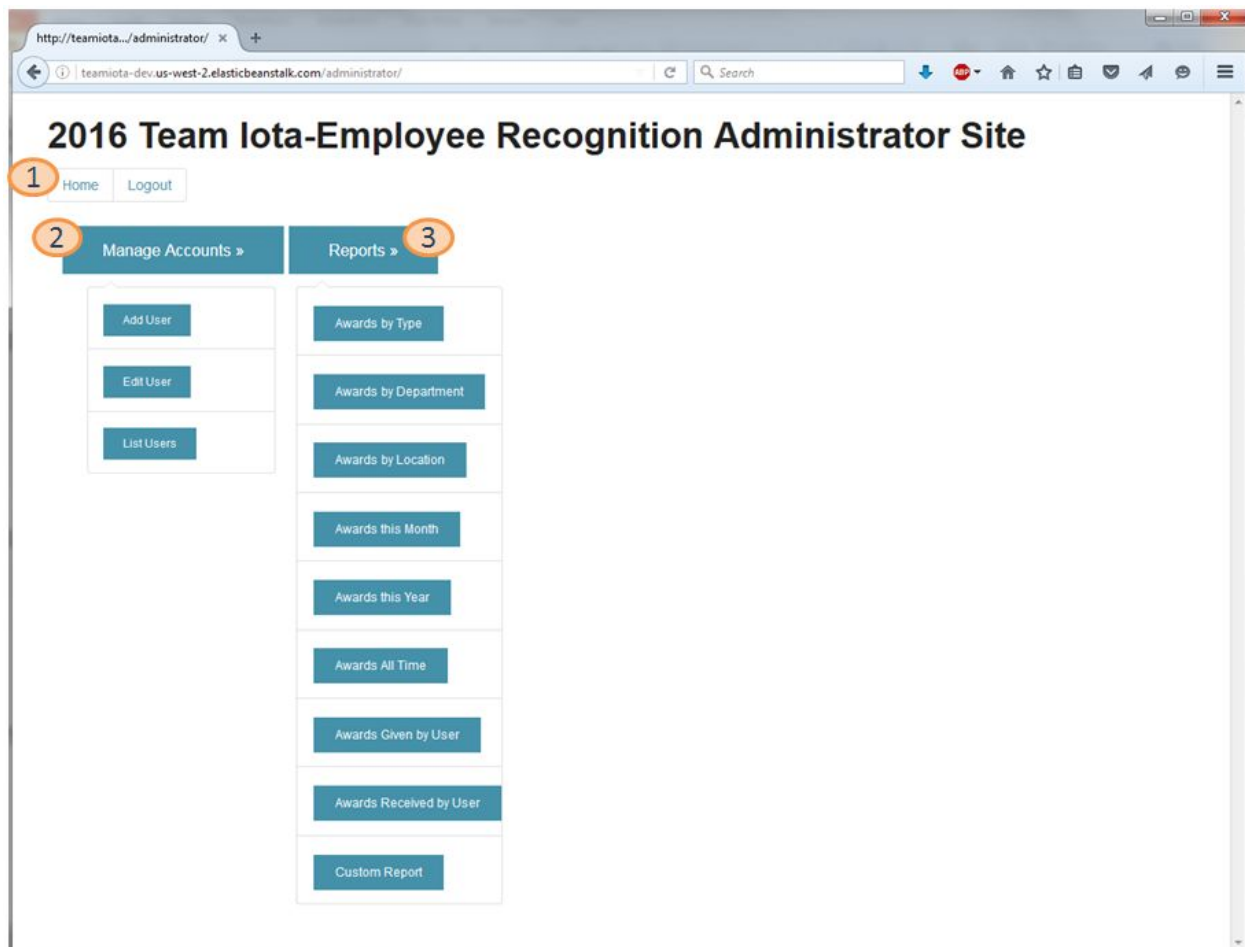
1. Menu Bar - provides quick access to the home page (displayed here) and Logout
2. Manage Accounts - menu provides access to Add User, Edit User, and List Users pages
3. Reports - menu provides access to range of pre-defined reports and custom report form

Add a User

To create a new user:

1. Login with an admin account.
2. Click the **Manage Accounts >>** button and select **Add User** from the menu.
3. Enter all of the fields and press the **Add User** button.
4. The new user account is created and a success message is displayed.
5. Click **Home** in the menu bar to return to the Admin Portal home page.

Edit a User

To edit an existing user:

1. Login with an admin account.
2. Click the **Manage Accounts >>** button and select **Edit User** from the menu.
3. Enter the email address of the user you wish to edit in the **Existing Email** textbox and then press the **Edit User** button.
4. The matching user's current account information is displayed. Edit any of the fields as desired and press the **Submit Query** button.
5. The user's information is updated and the main Admin Portal page is displayed.

View Users

To view all users currently in the system:

1. Login with an admin account.
2. Click the **Manage Accounts >>** button and select **List Users** from the menu.
3. A table is displayed with all of the currently registered users. From here you can:
   a. Click the **Edit** button to go to the edit screen (step 4 in Edit a User above).
   b. Click the **Delete** button to go to the delete confirmation screen (step 4 in Delete Users below).
   c. Click **Home** in the menu bar to return to the main Admin Portal page.

Delete Users

To delete an existing user:

1. Login with an admin account.
2. Click the **Manage Accounts >>** button and select **List Users** from the menu.
3. A table is displayed with all of the currently registered users. Click the **Delete** button next to the user you wish to delete.
4. Click **Yes** in the confirmation message to permanently delete the user (and their associated awards), or No to cancel and return to the user list.

View Predefined Reports

To generate a report:

1. Login with an admin account.
2. Click the **Reports >>** button and select a report from the list.
3. The requested report is displayed including a summary table, chart, and detailed report data. From here you can:
   a. Click the **Back <<** button to return to the Admin Portal home page.
   b. Click the **Export Data** button to download the Report Data table in CSV format
   c. Click the up/down arrows in column headers to sort the data

Create Custom Reports

To generate a report based on custom filters:

1. Login with an admin account.
2. Click the **Reports >>** button and select **Custom Report** at the bottom of the list.
3. Select the filters you would like to apply and click the **Create Report** button.
4. The filtered report is displayed including a summary table and detailed report data. From here you can:
   a. Click the **Back <<** button to return to the Admin Portal home page.
   b. Click the **Export Data** button to download the Report Data table in CSV format
   c. Click the up/down arrows in column headers to sort the data

> **Note**: Export Data only exports the report data currently displayed on screen. Change the "Show # entries" dropdown value as needed to ensure you get all of the desired data.
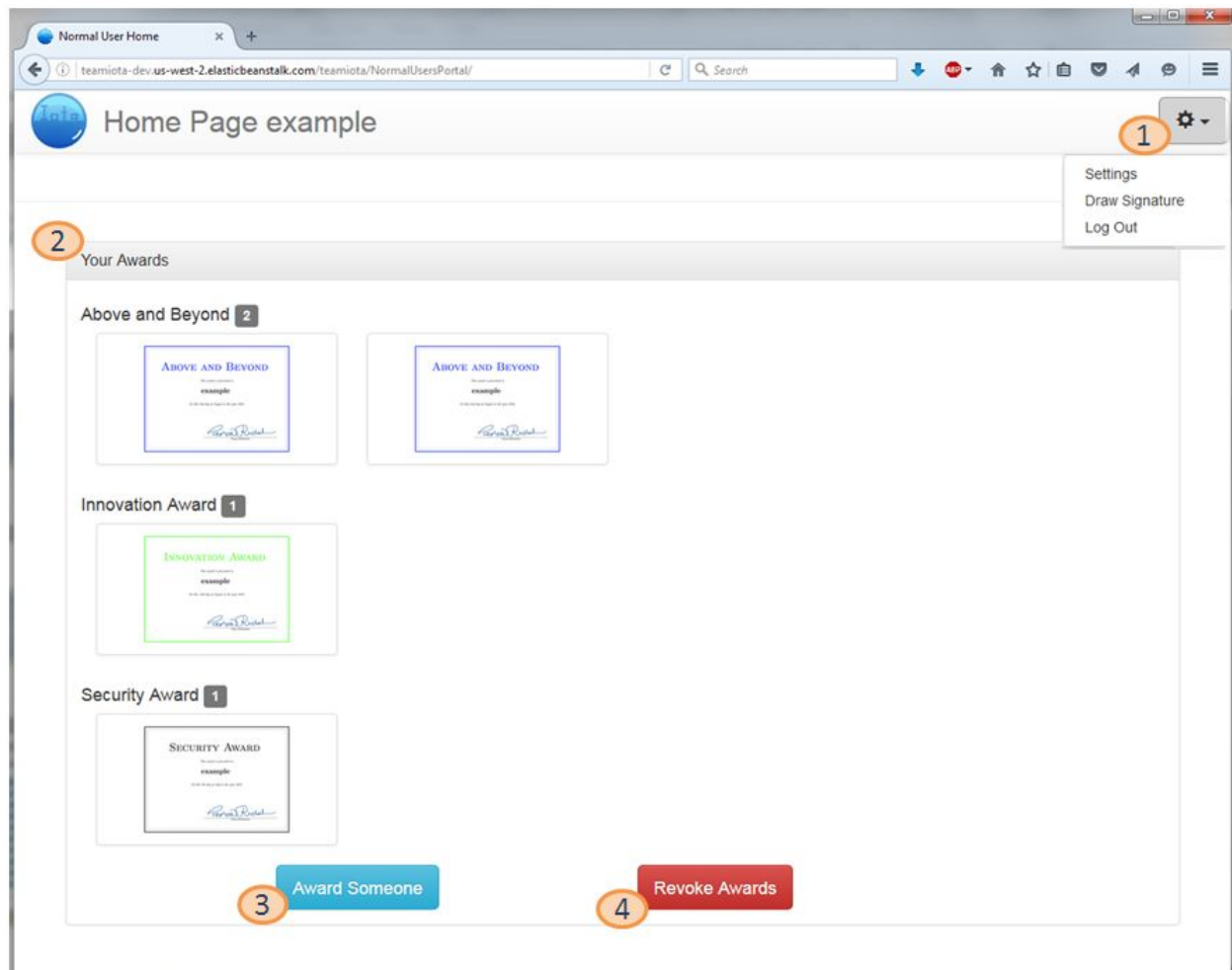
Logout

To end your session:

1. Login to the Admin Portal and perform any of the actions above.
2. Click the **Logout** button in the menu bar.
3. Your account is logged out and the login page is displayed.

User Portal

The User Portal allows you to manage your account information, view awards you have received, and create awards for other users. The screenshot below shows the User Portal home page and provides an overview of the major components.

1. Manage Menu - provides access to Settings (where you can edit your nickname and signature), Draw Signature (where you can draw a signature right in the browser), and Log Out
2. Awards Grid - displays a thumbnail of every award you have received, organized by type; click on a thumbnail to open the details view
3. Award Someone - allows you to create an award for other users
4. Revoke Awards - deletes all awards that you have previously granted (after confirmation)

Edit User Profile

To edit your account information:

1. Login with a user account.
2. Click the manage button (⚙▾) in the upper-right corner and select **Settings** from the drop-down menu.
3. Enter a **Nickname**. This is the name that will appear on your awards.
4. Upload an image or draw your signature that will appear in the signature block of awards you grant to other users.
   To upload a signature image:
   a. Use the provided test image (signature.jpg in the top-level of the zip folder) or prepare an image with your signature that meets the following requirements:
      Format: JPG or PNG
      Size: Automatically resizes uploaded image to 350 pixels wide x 100 pixels tall. Ignores aspect ratio.
   b. Click the **Browse…** button.
   c. Navigate to where the image from step a is saved on your file system and click the **Open** button.
   To draw a signature image:
   a. Click the **Draw Signature Instead** button.
   b. The Draw Signature screen is displayed. Follow the directions for Draw a Signature below.
5. Click the **Submit** button to apply your changes.

> **Note**: if you choose to Draw Signature Instead and switch to the Draw Signature screen, your nickname changes will not be saved. When you have completed saving your signature, return to the Settings page and click the **Submit** button.

Draw a Signature

To draw a signature image:

1. Login with a user account as described above.
2. Click the manage button (⚙▾) in the upper-right corner and select **Draw Signature** from the drop-down menu.

3. Use your mouse to draw a signature in the designated area.
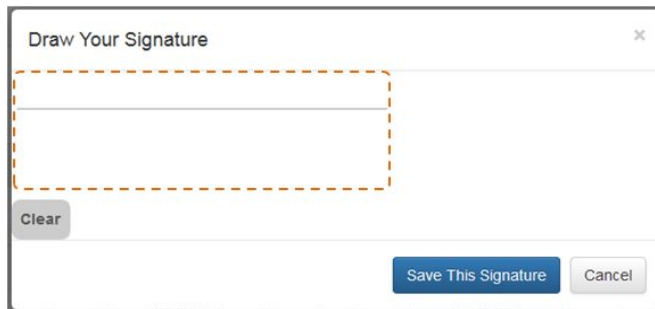
4. Click the **Save This Signature** button to save your drawing.
5. Click **OK** on the confirmation message.

View Awards

To view awards that you have received from other users:

1. Login with a user account.
2. The main page displays a grid of all awards you have received, organized by category.
3. Select an award thumbnail to view the details.
4. Click the X in the upper-right corner of the award details screen to return to the main page.

Save Award as PDF

To save an award:

1. Login with a user account.
2. Click on a thumbnail in the Awards Grid.
3. Click the **Save PDF** button.
4. The award certificate is downloaded as a PDF to your system.

Note: step 4 varies depending on your browser. The PDF file may be placed in Downloads or it may be displayed in the current browser window. If this is the case, click your browser's Back button (when you have completed saving the PDF) to return to the Awards Grid.

Print Award

To print an award:

1. Login with a user account.

2. Click on a thumbnail in the Awards Grid.
3. Click the **Print Certificate** button.
4. A print dialog is displayed. Configure settings as desired and click **OK** or **Print**.

Note: step 4 varies depending on your browser. It may be necessary to go into your printer properties and select Landscape mode for the certificate to print correctly.

Create Award

To grant an award to another user:

1. Login with a user account.

Note: you must create a signature image before creating an award. You can create a signature by uploading a signature image or drawing one, as described in the sections above. If you have not created a signature yet, the Submit button in the Create Award dialog will be locked.

2. Click the **Award Someone** button at the bottom of the Awards Grid to display the Create Award dialog.
3. Select an **Awardee** (the person receiving the award) and an **Award Type** from the respective drop-downs.
4. Select a **Date** for the award. Note that the award certificate will be immediately issued, but the date listed on the award may be today or a day in the past or future.
5. Click **Submit** to create the award. The newly created award will be emailed to the recipient as a PDF attachment and will appear in the Awardee's Awards Grid.

Revoke Awards

To revoke awards that you have previously award to other users:

1. Login with a user account.
2. Click the **Revoke Awards** button at the bottom of the Awards Grid.
3. A confirmation message is displayed. Click **Accept** to revoke all awards or the **X** in the upper-right corner to cancel.

Note: Revoke Awards removes all awards that you have granted to all other users and cannot be undone. Use with caution.

Logout

To end your user session:

1. Login to the User Portal and perform any of the actions above.
2. Click the manage button (⚙▾) in the upper-right corner and select **Log Out** from the drop-down menu.
3. Your account is logged out and the login page is displayed.

Software and Systems

This section provides an overview of the major systems, software and database structure used in the project.

System Components

The diagram below shows each of the major components that make up the project:
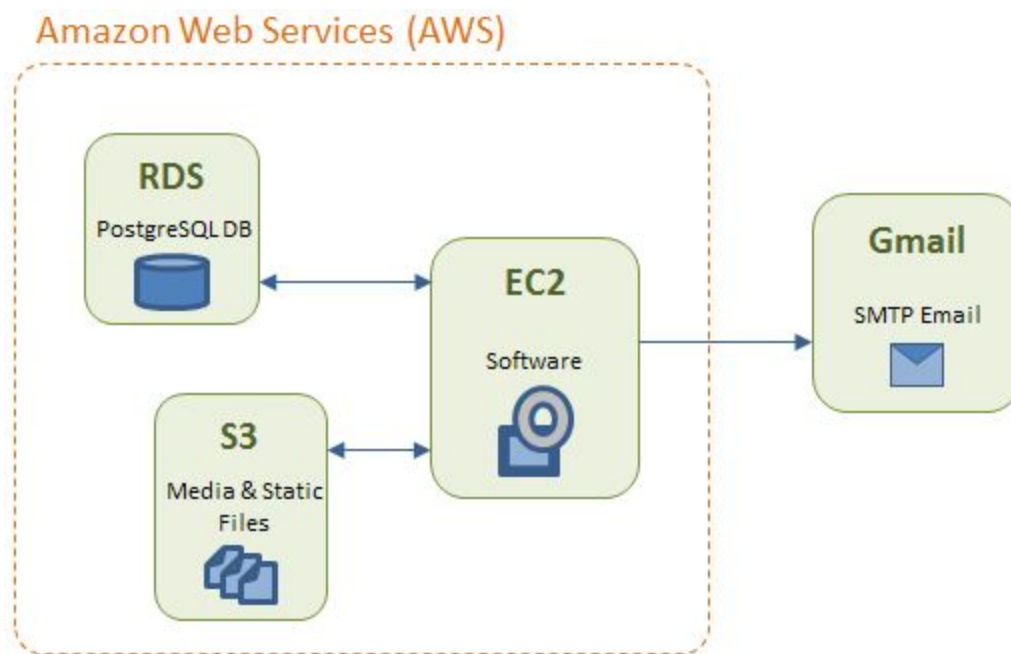
RDS
RDS, or Relational Database Service, is Amazon's cloud-based database service. The project uses an RDS instance running the PostgreSQL database engine to store user and award information.

S3

S3, or Simple Storage Service, is Amazon's cloud storage service. The project stores all media files (such as signatures and thumbnail certificates) and static files (such as javascript and css) in an S3 bucket.

Gmail

The project sends emails for new award certificates and password resets through Gmail via the SMTP interface.

EC2

EC2, or Elastic Cloud Compute is Amazon's virtual server service. The project utilizes a Linux server running Apache that is managed through Elastic Beanstalk to run all of the project-related software. Elastic Beanstalk is a service that wraps the EC2 instance and makes it easy to deploy and manage web applications. Each of the software components running on the EC2 instance are explained in the subsequent section.

Software Components

The diagram below shows each of the major software components running on the Amazon EC2 instance:
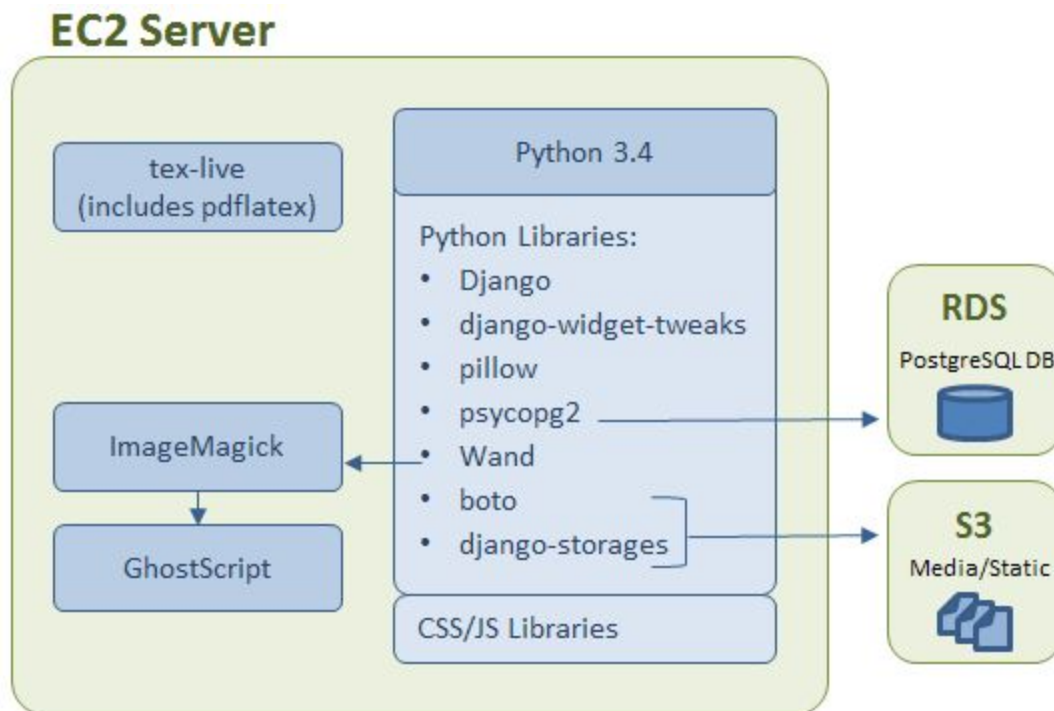
TeX Live
TeX Live is one of the major TeX typesetting programs available for Linux systems. It includes pdflatex which the project uses to convert a LaTeX template into a PDF file for certificates. pdflatex is called directly by the Python code, using the subprocess module in the Python Standard Library to create a new process and execute pdflatex.

ImageMagick / GhostScript / Wand
ImageMagick is open-source software for editing and converting image files. The project uses ImageMagick to convert PDF certificates to image files and resize images to thumbnails for display in the view. The project uses ImageMagick software via the Wand Python library, which wraps ImageMagick commands into easy-to-use Python classes. ImageMagick relies on GhostScript to render PDF files; this process is transparent to the project.

Python / Django
The project is implemented in Python version 3.4, using the Django web framework. It follows Django's model-view-controller, or MVC, architectural pattern and contains two applications: administrator and teamiota (NormalUsersPortal), as well as general project modules common to both applications.

Django-Widget-Tweaks
Django-widget-tweaks is a Python package for tweaking form field rendering in the project's templates. "Tweaking" is the Django term for customizing the default field presentation in forms.

Pillow
Pillow is the currently adopted fork of PIL, or Python Imaging Library, that provides support for opening, manipulating, and saving image files. The project does not directly import or use Pillow, but Django requires it for ImageFields in the model (database).

Pyscopg2
Pyscop2 is a Python PostgreSQL database adapter that implements the Python DB API. Django uses the API to make queries and changes to the PostgreSQL database running on RDS when the project saves or queries the Django model.

Boto / Django-storages for S3
Django-storages is a storage API for interacting with various backends, including Amazon's S3. The project uses standard file access calls, which django-storages translates and communicates to S3. Django-storages leverages boto, a Python interface to AWS, for communication with the S3 bucket.
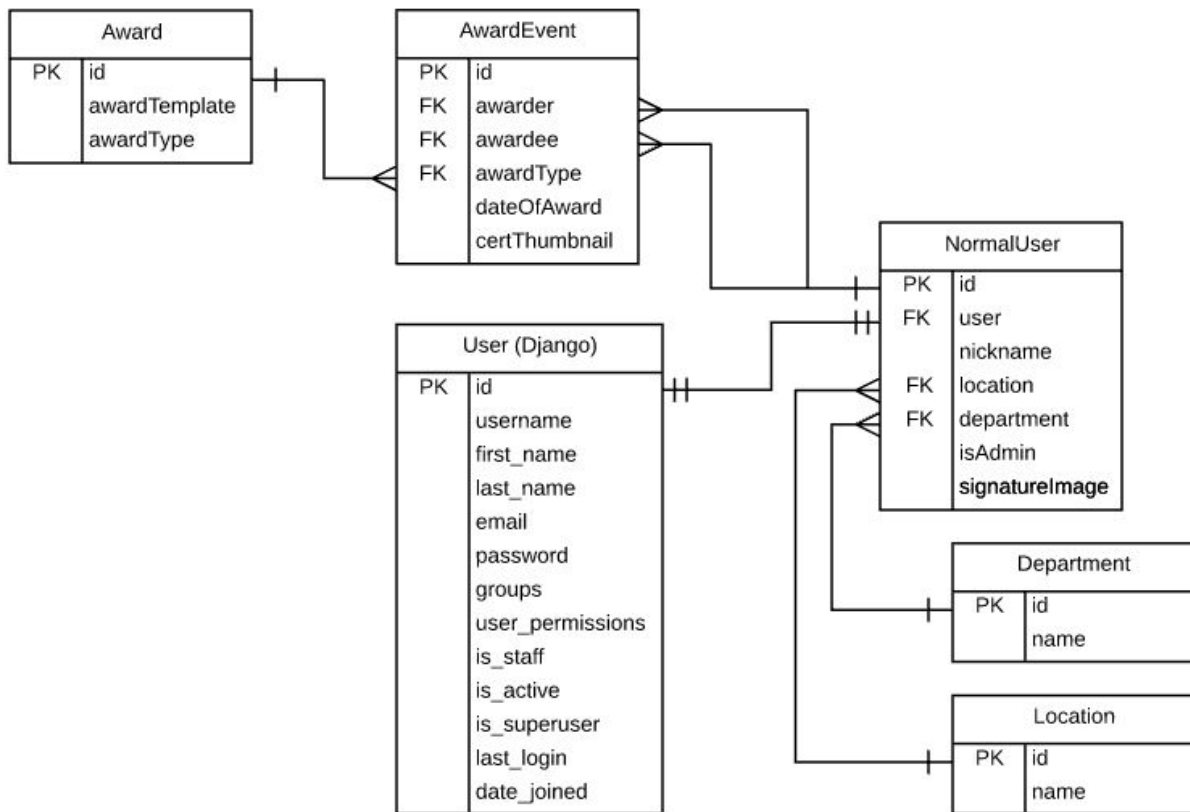
CSS/JS Libraries

The project used various CSS and JavaScript libraries for styling the views including:

- Bootstrap - Users portal
- Concise - Admin portal
- Google Charts - report charts in Admin portal
- DataTables - report tables in Admin portal; provides pagination and column sorting
- Signature-pad - A jQuery plugin for drawing signatures

Database Structure

Data associated with users and awards is stored in a SQL database as shown in the Entity-Relationship Diagram below. The project leverages the existing Django User Model and extends it with the NormalUser table.

Development Environment

The following software and systems were used to complete this project:

Programming Languages	Python, HTML, CSS, JavaScript
Frameworks/Libraries	*Python:* Django (web framework), django-widget-tweaks (forms), pillow (images), psycopg2 (PostgreSQL), and Wand (ImageMagick) *CSS Styling*: Bootstrap, Concise *Certificate Generation*: pdflatex, ImageMagick *Report Display*: Google Charts, DataTables *Signature Drawing*: thomasjbradley/signature-pad
Database / File Storage	PostgreSQL on AWS RDS Instance AWS S3 bucket for media and static file storage
Server	AWS EC2 Instance with Elastic Beanstalk (Apache on Linux)
Other Systems	Gmail
Development Tools	Git, Text Editors (various), Elastic Beanstalk Command Line Interface (EB CLI), pylint

Team Member Accomplishments

Daniel Bonnin:
- Designed and implemented User Interface of Normal Users Portal
  - Settings Menu
  - Edit User Form
  - Draw Signature Form
  - Awards Grid
    - Dynamic thumbnail presentation
  - Award Detail View
    - Full size certificate presentation
    - Download feature
    - Print feature
- Designed and implemented user authentication system
  - login/logout
  - Redirect Users on user type
  - Reset password
- Migrated static and media files storage to AWS S3 from local storage on EC2 instance

Onur Ozay:
- Designed and implemented User Interface of Admin Users Portal
    - Reports
        - CSV download option for each report
    - Manage Accounts
        - Add User
        - Edit User
        - List Users

Tanna Richardson:
- Setup AWS EC2 instance and created .ebextensions files and python seed files to automate deployments
- Designed LaTex template, populated with data from Model and processed with pdflatex to create PDF award certificates
- Generated email for new awards with PDF certificates as attachments
- Utilized ImageMagick library to convert certificate PDFs to image files and resize to thumbnails for display in View
- Developed HTML view of reports, including writing queries for predefined reports, creating custom report form and generating corresponding query, and converting query results into user-friendly reports with Bootstrap, DataTables and Google Charts
- Authored MidPoint Check and Final Report

Conclusion

Team Iota has met or exceeded all of the requirements from the Project Plan. However, as the project progressed, we deviated slightly from the Project Plan in the following ways:

- Database
    - We have chosen to use Postgres over MySQL for improved interaction with Django
    - We modified fields on some database tables to accomodate image handling and Django's User schema
    - We removed the separate "AdminUser" User type from the database schema, opting for an isAdmin flag instead, to simplify our design
- Login Flows
    - We removed any initial setup for first-time users, opting instead to enforce signature image upload upon creating an award.
    - We combined the login backends for both user types, differentiating them only on which page to redirect to, based on the isAdmin flag.

- - ○ We made use of Django's built-in authentication views for better security.
  - ● Frameworks
    - ○ We used the signature-pad javascript library for drawing signatures
    - ○ We used the Concise css framework to style the admin site, instead of Bootstrap, in order to differentiate the two portals
    - ○ We incorporated AWS S3 for cloud storage to conform to recommended best practices
  - ● Stretch Goals (defined in the Project Plan)*
    - ○ Grid of certificate thumbnails on Normal User Home Page
      - ■ On thumbnail selected, display full size certificate
    - ○ Openid Connect login
    - ○ Unified login portal that dynamically redirects to correct portal based on user type
      - ■ Admin User, Normal User
    - ○ Share award on social media button(s)
    - ○ Print award button
    - ○ Draw Signature Field
      - ■ Normal Users can choose to draw their signature with pointing device
        - ● Clear Button
          - ○ Clears Signature Drawing Canvas
        - ● Approve Button
          - ○ Sets approved signature
          - ○ Triggers processing of signature image
    - ○ Admin User lookup Normal User by name, other
    - ○ Custom report filters

* Completed, Not Completed, Partially Completed

- ● Time Estimates
  - ○ The authentication system took less time than estimated (estimate: 40, actual: 10)
  - ○ Setup of local development environment (estimate: 5 hours, actual: 15*)
  - ○ Setup AWS environment (estimate: 8 hours, actual: 20*)
  - ○ Final system testing and bug fixes(estimate: 10 hours, actual: 20*)

*All 3 of local environment time estimate, AWS environment time estimate, and testing/bug fixing time estimate are actually too highly coupled for an accurate breakdown.

*These time estimates are an average estimate per team member, the actual per-team-member times spent are unknown.

Team Iota experienced a few setbacks, such as system incompatibilities and difficult root-cause investigations, but were able to recover by excellent cooperation and communication.