MICHIGAN STATE UNIVERSITY

Project Plan

Visualizing Dynamic Data Exploration

The Capstone Experience

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From Students…

…to Professionals

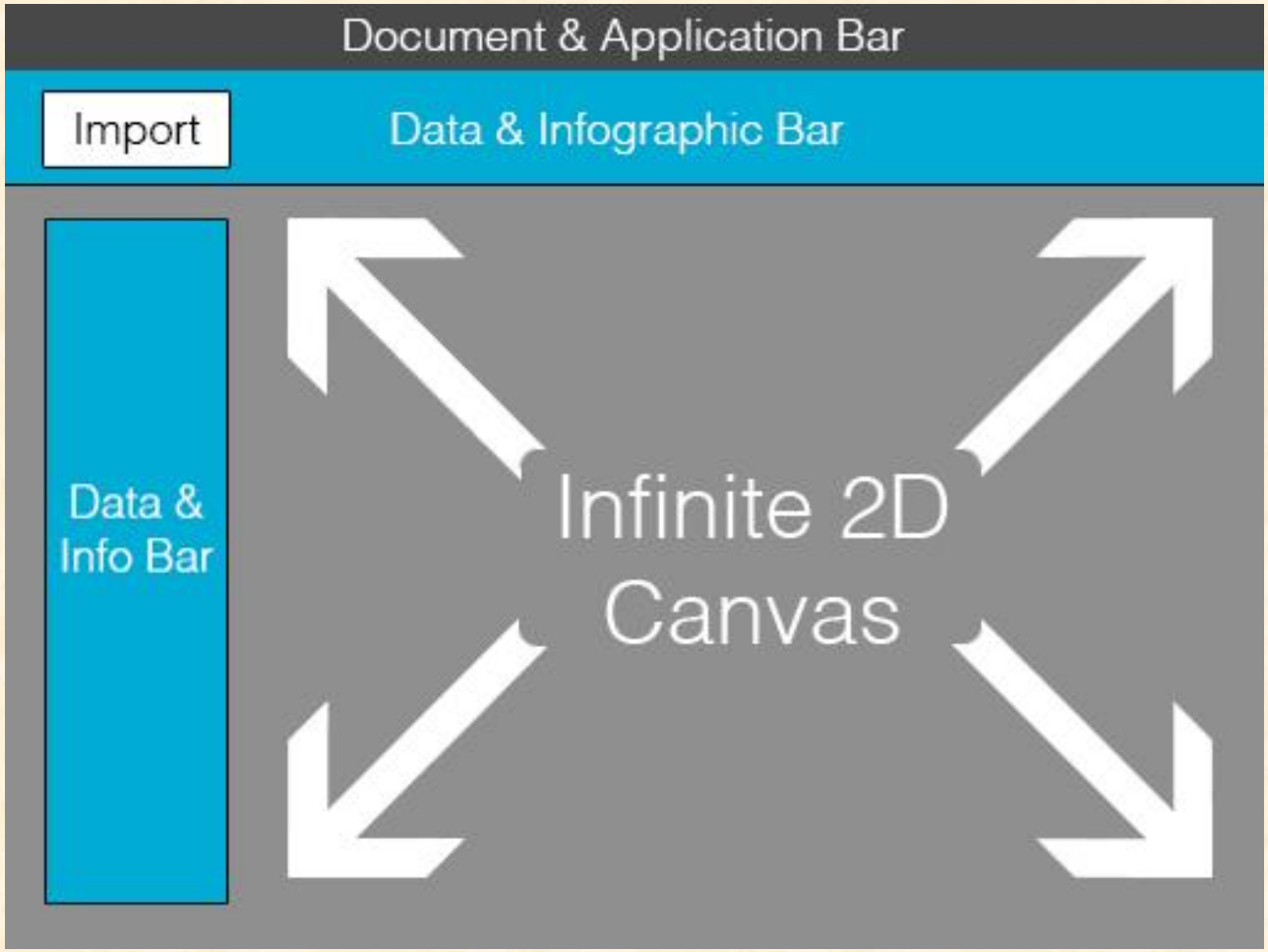
Functional Specifications

- Identifying important insights and trends in data gathered on hundreds of thousands of candidates has become increasingly more complex and time consuming
- Web app that will allow the user to display the data as 2D and 3D visualizations that can be explored and adjusted dynamically
- The app will make it easy for the user to analyze vast amounts of data to quickly, identify trends that would normally be hidden in the typical Excel or CSV file
- The visuals will utilize simple shapes and concepts to make it easy for even non-technical users to explore complex data sets

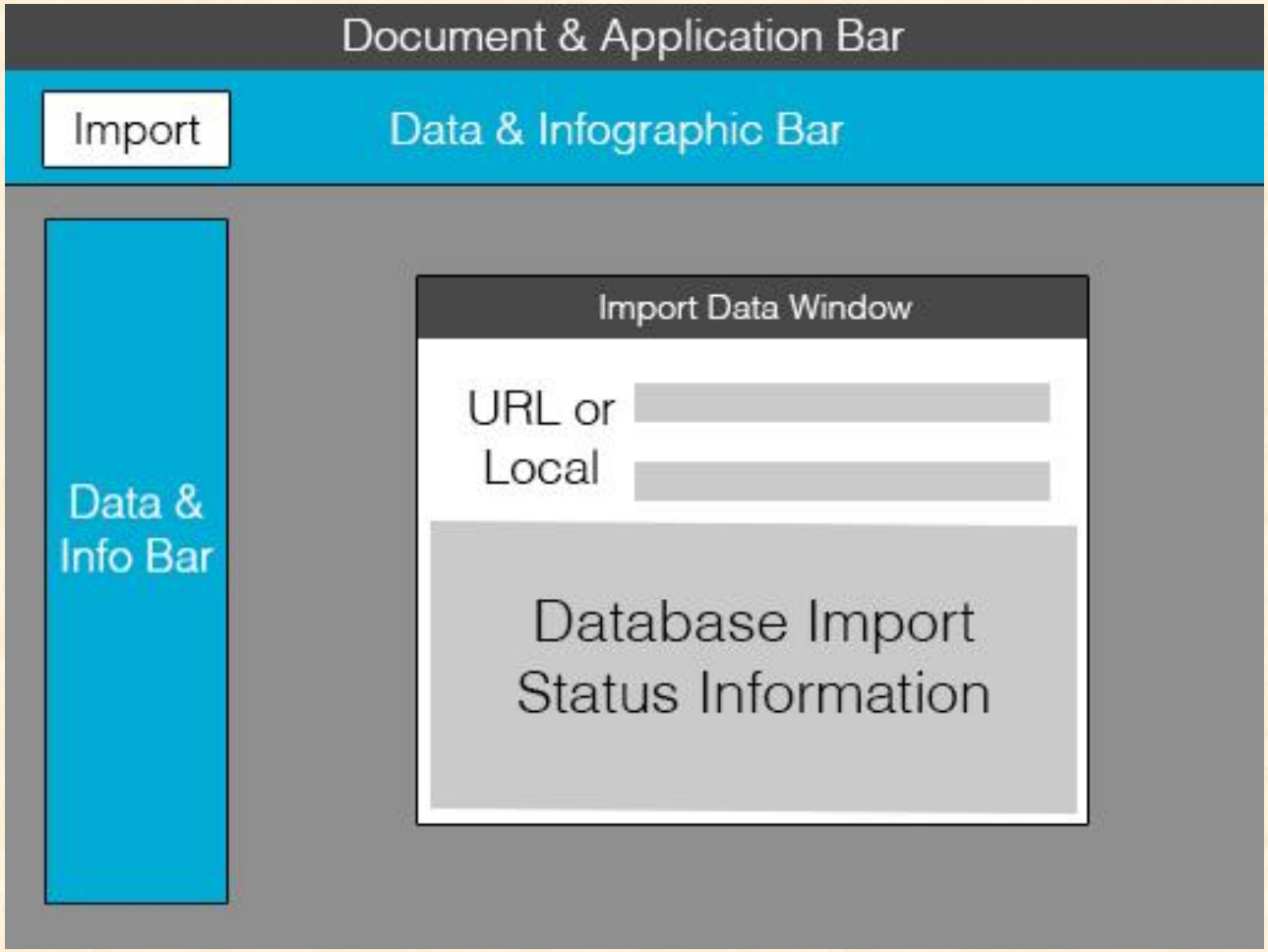
Design Specifications

- Canvas and Tools serve as the primary focus of the user. The canvas will be an infinite 2-Dimensional workspace that will give the user freedom to manipulate the data visuals in different ways without feeling overwhelmed or cramped for space.
- Once the application creates the visualization, the user is able to manipulate the infographic and the data represented within the application. By utilizing the Visual Toolbar, the data can be filtered, expanded, or restricted to give further insight on what underlying trends are being represented.
- The design of this application is focused on making complex data manipulation and trend identification accessible to non-technical users. By concentrating on simple designs and workflows the application allows the user to concentrate on analyzing the data rather than the tool.

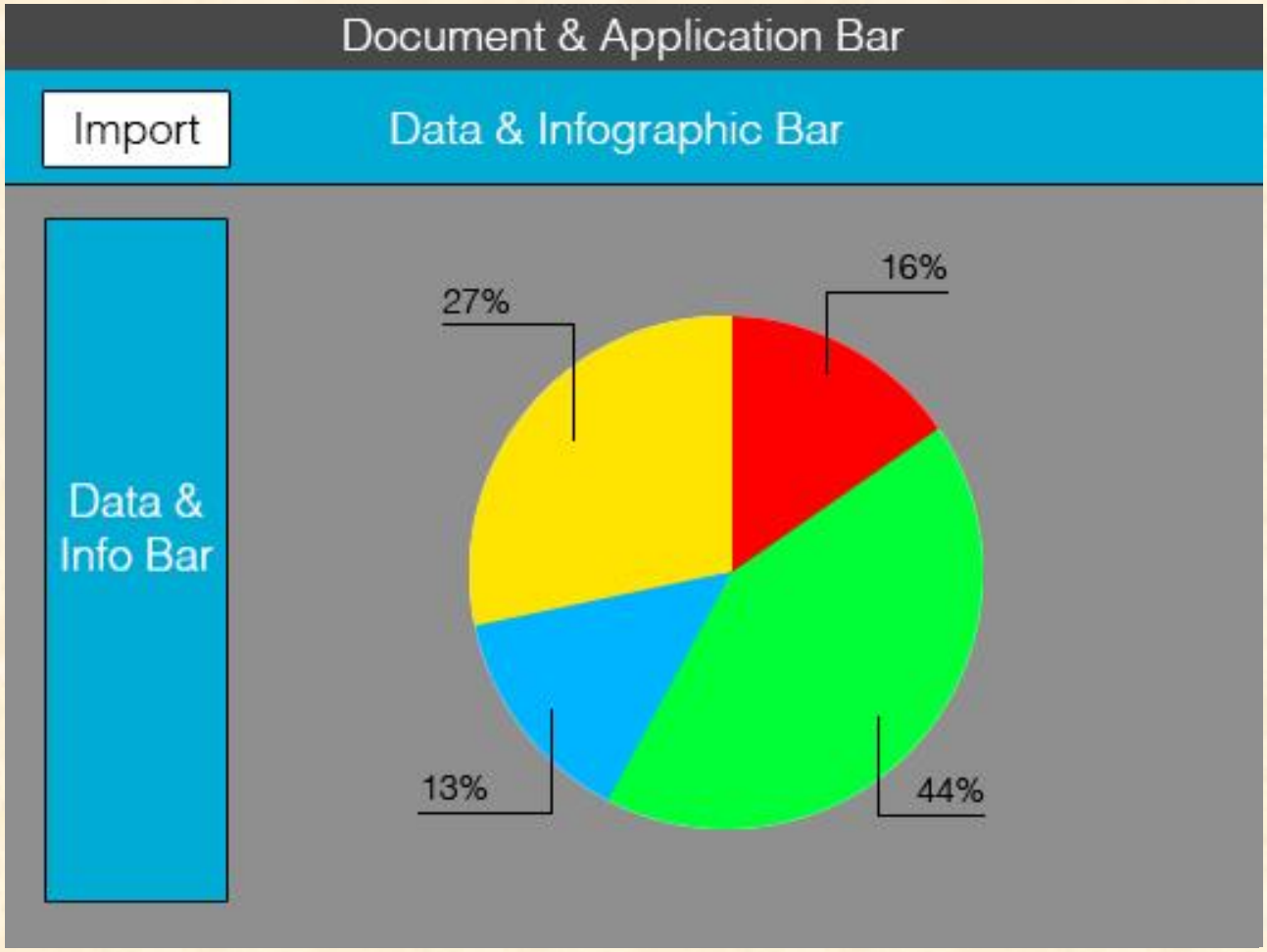
Screen Mockup: Application Overview



Screen Mockup: Import Window



Screen Mockup: Data Visual



Technical Specifications

- Front End
  - Django
    - Framework for application page
  - JavaScript
    - Implements D3.js for Data Visuals
  - HTML
    - To implement views for application page
  - CSS
    - Used to design pages for functionality and for aesthetics

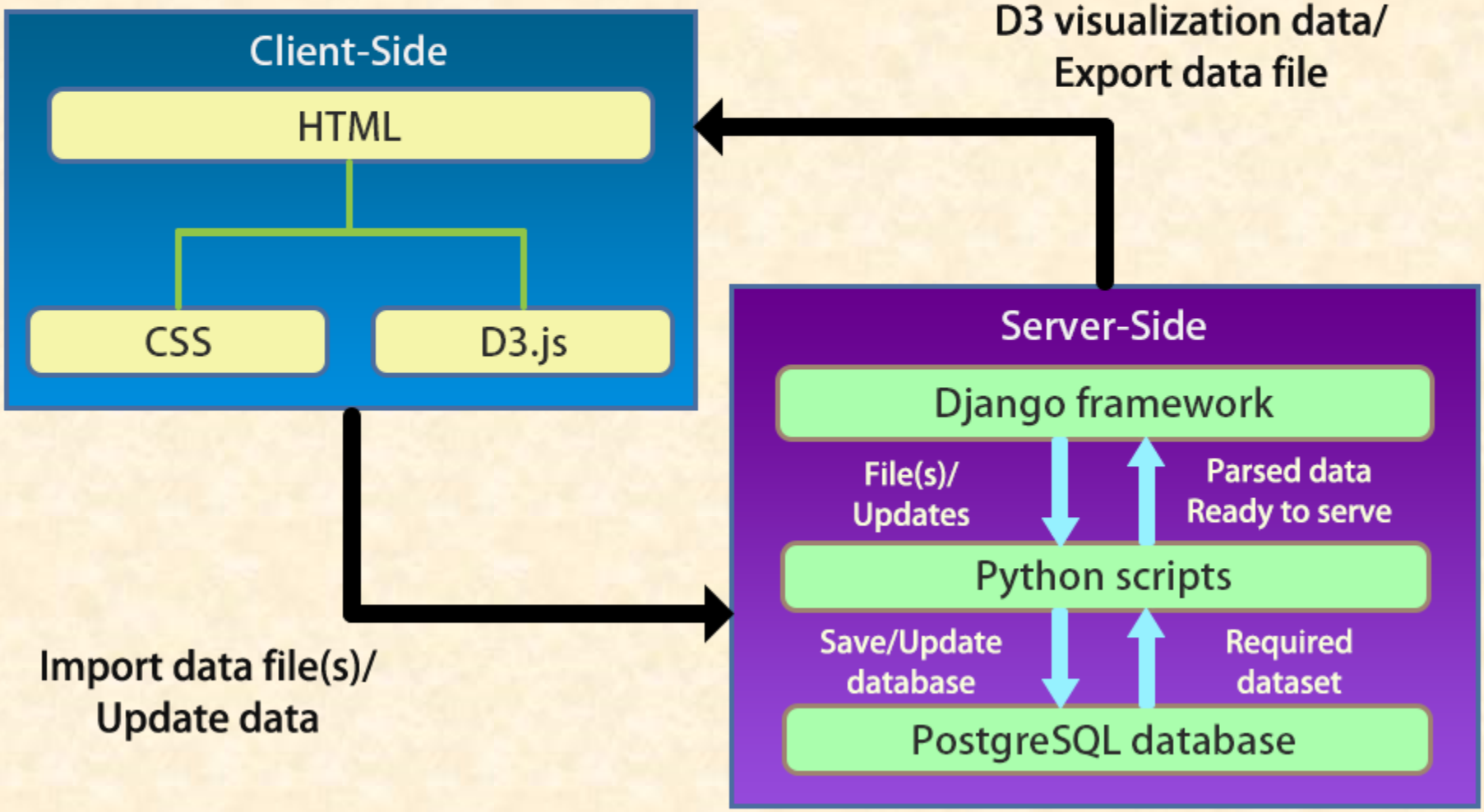
Technical Specifications

- Back End
  - Ubuntu 16.04.1
    - Server Version
  - Apache 2
    - Web Server
  - Python
    - Data Manipulation
  - SQLite
    - Data Storage
  - Django
    - Portal between web page and server

Technical Specifications

- Hardware and Software
  - Server
  - IDE's
    - Pycharm
      - ❖Python and Django
  - Text Editor
    - Sublime
      - ❖CSS and miscellaneous other file editing

System Architecture



System Components

- Hardware Platforms
  - Rack Server Ubuntu, iMac OSX, VM Windows
- Software Platforms / Technologies
  - Apache
  - SQLite
  - Python
  - JavaScript

Testing

- Unit testing for Python backend using unittest
- Capybara for UI testing
- Cross browser compatibility
- Google Chrome Accessibility Developer Tools to test ADA compliance

Risks

- Sensitive Data Access
  - Need to determine how to handle potentially sensitive data that a user may provide
  - Mitigation: Discuss with our clients how best to handle this
- Ruby on Rails for Data Manipulation
  - The team is unfamiliar with Ruby and Ruby on Rails and therefore unsure if it will be the best course of action going forward, especially for the programming intensive data manipulation.
  - Mitigation: Using pure Python approach via Django
- Handling Varying Amounts of Data Sizes and Types
  - Currently unsure how to access and manipulate data sets of varying sizes and types. Need to determine how to standardize the process for different inputs.
  - Mitigation: Rigorous Testing