

Lab 2 –Strome Infusion Specification Outline

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1. Introduction

The U.S. Census Bureau's latest annual data report on "Statistics of U.S. Businesses" reported that between the years 2011 and 2012 there were 662,470 new employers, and the total number of small businesses was 28,713,561 ("Statistics", 2012). With hundreds of thousands of ventures being created every year, as well as an immeasurable number of others who may be interested in starting one, there is a large interest in information and resources useful to new entrepreneurs

The Old Dominion University (ODU) Strome Entrepreneurial Center (SEC) was created to help address the needs of nurturing small businesses, and to encourage students to look at entrepreneurship as a viable career option ("Strome", 2014). The SEC's main goals are to help educate students on the many facets of entrepreneurship, and to give them some of the resources needed to help start a small business of their own ("Strome", 2014).

1.1 Purpose

Strome Infusion was designed to address many of the issues plaguing the SEC with its current online system. Strome Infusion streamlines the registration process, making it simpler and easier for students to register online with the SEC. ODU Students who register with their ODU email address will automatically be approved, and all others who wish to use the service will have to wait for the SEC to approve them. Strome Infusion will allow students access to resources and information, such as connecting with other entrepreneurs and external companies, which are not provided by the current system operated by Venture Hive.

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The most important feature of Strome Infusion is the new and improved SEC website. The new SEC website will allow students to access information concerning the SEC, and the SEC's online resources and services. The new website will have a streamlined registration process for ODU students that will require the student to input their first and last name, and their valid ODU student email address. Once a student is registered he or she will automatically have their account information set up, including credentials and skills they have that could contribute to a venture someone else is running or hoping to create. Ventures and external companies can also use this website to create pages for themselves, so that they can be introduced to students with skills that could benefit them.

Strome Infusion will have a mobile application that will be capable of all of the same features as the main website, as well as a few mobile features such as pushing notifications to the user's phone to keep them updated on information important to their success with the SEC.

The last important feature of Strome Infusion is its database. The database will contain a collection of information including student accounts and skills, venture accounts, external company accounts, and projects that are currently being worked on within the SEC.

1.2 Scope

Strome Infusion was designed to address many of the issues plaguing the SEC with its current online system. Strome Infusion streamlines the registration process, making it simpler and easier for students to register online with the SEC. ODU Students who register with their ODU email address will automatically be approved, and all others who wish to use the service will have to wait for the SEC to approve them. Strome Infusion will allow students

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access to resources and information, such as connecting with other entrepreneurs and external people, which are not provided by the current system operated by Venture Hive.

Strome Infusion's prototype will be developed with the goal of demonstrating that a new website and mobile app will allow the SEC to help student entrepreneurs more efficiently. The prototype will accomplish this through three major improvements in functionality from the current system. A better and simpler registration system will make it easier for students to register on the SEC website and record any visits they have made to the SEC building. The prototype will have a mobile web application that will allow students to register and use the SEC website from any location. The prototype will have project management features that will allow students to connect with other entrepreneurs and businesses.

The prototype will be very similar to the real world product, but with some key differences. As it is shown in Table 1, the prototype will be run on virtual servers, it will simulate staff, students, and resources through data given by Strome Infusion team members, and the mobile version will only be developed for Android devices.

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Feature	Real World Product	Prototype
Authentication	Integration with 3rd party schemes such as shibboleth	Custom authentication
Client Testing	Testing across a large variety of mobile and desktop web browsers	Mobile testing on only the devices that our team members own. Full support only for modern browsers
Customer Support	Telephone and email support for problems or questions using the application	Not simulated – Customer support is a common need for software applications.
Events	Ability to list events and add events to a calendar view for individuals and companies	Eliminated from prototype
External Resources	External investors and mentors who are willing to contribute to the success of the venture.	Test data provided by Director Grden and the Strome InFusion team
Internal Resources	Students who want to utilize their skills to work on a business venture.	Strome InFusion team members connecting as a venture to test functionality
Mobile Application	Mobile application will be available natively for all major mobile OS platforms	Will only be available natively for Android devices
SEC Staff	SEC staff and mentors who will provide guidance for the project.	Director Grden as well as Strome InFusion team members simulating Strome Entrepreneurial Center staff
Security	Audited to confirm the security of proprietary data	Not reviewed
Service	Support for scaling to multiple servers and other environments	Limited to the capabilities of a single virtual machine
Service Integrations	Integrate with existing software and services used by universities such as Microsoft Lync	Integrated with email
Students	Students at ODU who wish to collaborate on a business venture	Actual student and Strome InFusion team members using virtual machines using Strome InFusion team data along with special test functionality

Table 1. Feature Comparison between Real World Product and Prototype

1.3 Definitions, Acronyms, and Abbreviations

ACID compliance: Atomicity, consistency, isolation, and durability are the properties that guarantee that a database transaction is processed reliably.

Agile (Software Development): A group of software development methods in which solutions evolve through collaboration between self-organizing, cross-functional teams. It promotes adaptive planning, evolutionary development, early delivery, continuous improvement, and encourages rapid and flexible response to change.

AngularJS: A structural framework for dynamic web applications, based off of JavaScript.

Apache Cordova: An open source project that provides a set of device APIs that allow a mobile application to utilize native device functions from JavaScript.

Apache web server: The world's most widely used web server software.

API server: A computer that provides API data over a network.

Application Programming Interface (API): An application programming interface is a set of routines, protocols, and tools for building software applications.

Application server: The middleware of a server centric architecture.

Backend: The server, the web application, and the database.

Business Canvas: A strategic management and lean startup template for developing new business models.

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Company: Any business that is owned or operated outside of ODU.

Company resource: A resource an external company registers in Strome InFusion to assist with student ventures.

Concurrency: Allowing multiple processes to go at once.

Cordova: See Apache Cordova.

CSS: Cascading style sheets, gives form to the HTML page.

Data integrity: The accuracy and consistency of data stored in the database.

Database: A comprehensive collection of related data organized for convenient access.

DOM: The Document Object Model is a logical structured document applied to HTML, it represents separate and distinct browsers and interfaces to view and interact with the web application.

Employer: A person or company that hires at least one or more employees.

Encryption: Encoding information in a way that is not readable except by authorized entities.

Entrepreneur: A person who organizes and operates a business or businesses, taking on greater than normal financial risks in order to do so.

Firewall: Software that prevents hackers from gaining access to systems with sensitive data.

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Flask: A python web application framework.

Frontend: The HTML, CSS, and JavaScript of a web page.

GUI: Graphical user interface, is an interface that allows the user to interact with the application.

Horizontal Scaling: Adding more nodes to a system, such as adding a new computer to a distributed software application.

HTML: Hypertext Markup Language, a standardized system for tagging text files to achieve font, color, graphic, and hyperlink effects.

InFusion: An alternative name for Strome InFusion.

JavaScript: An object-oriented computer programming language commonly used to create interactive effects within web browsers.

JSON: JavaScript Object Notation is a minimal, readable format of structured data.

Linux: A Unix-like and mostly POSIX-compliant computer operating system assembled under the model of free and open-source software development and distribution.

Linux distributions: Operating systems based off of the Linux kernel.

Load balancing: The distribution of processes across multiple available systems to improve performance.

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Mobile application: An application developed to be operated and interacted within a mobile operating system.

Monarch: Students, faculty, staff, and alumni of Old Dominion University.

Monarch Family: See Monarch.

Monarch Community: An individual or organization that is involved on campus, but is not a Monarch themselves.

MVC: Model View Controller is an architectural pattern for building applications.

MySQL: An open-source relational database management system.

Native application: An application that has access to system functionality (i.e. the camera on a cell phone).

Nginx: A web server with a strong focus on high concurrency, performance and low memory usage.

ODU: Acronym for Old Dominion University.

Object-relational database: Is a database that uses an object-oriented model: objects, classes, and inheritance are directly supported in the database schema and in the query language.

Object-Relationship Mapper (ORM): A programming technique for converting data between incompatible type systems in object-oriented programming languages.

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Open source: Software where the source code is freely available.

Operating system: The software that supports a computer's basic functions (i.e. launching applications and handling peripherals).

PostgreSQL: An open sourced, object-relational database system.

Push Notification: The delivery of information from a software application to a computing device without a specific request from the client.

Python: A widely used general-purpose, high-level programming language.

Representational State Transfer (REST): Software architectural style of the World Wide Web.

RESTful framework: Representational state transfer is an architectural style framework for the development of web services.

Reverse proxy server: A server that can retrieve resources from one or more servers.

SEC: Acronym for Strome Entrepreneurial Center.

SI: Acronym for Strome Infusion.

SDK: Software Development Kit, a set of software development tools that allow the creation of applications for a certain piece of software.

Server: A computer system that manages access to a central resource or service.

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Small Business: A business that has less than 500 employees.

SQL: Structured Query Language is used to communicate with relational databases.

SQLAlchemy: A Python SQL toolkit and Object Relational Mapper that gives application developers the full power and flexibility of SQL.

Stakeholder: A person who will be affected by the outcome of Strome Infusions development..

Toolkit: A set of software tools.

Ubuntu: An open source operating system based off of Linux.

User experience: The overall experience of a person using a product.

User skill: A skill a user registers in Strome InFusion to assist with ventures.

uWSGI: Deploys the application server and implements WSGI protocols.

Venture: A student run business enterprise with a dedicated profile within Strome InFusion.

Vertical Scaling: Adding resources to a single node in a system, typically involving the addition of CPUs or memory to a single computer.

Virtual Machine or VM: An operating system OS or application environment that is installed on software which imitates dedicated hardware.

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Web application: Client-server software application in which the client or GUI runs in a web browser.

Web application framework: A framework for software that supports web applications, services, and resources.

Web server: Systems that deliver web pages.

Web Server Gateway Interface (WSGI): Specification for simple and universal interface between web servers and web applications for the Python programming language.

1.4 Resources

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1.5 Overview

This product description provides Strome Infusion's prototype architecture, interfaces, and functionality. The information provided in the rest of this document includes requirements and descriptions of the hardware, software, and external interface of the Strome Infusion prototype.

2. General Description

The Strome Infusion prototype is explained in detail in the following sections. Section 2.1 describes the prototype's architecture, and the major components that it is comprised of. Section 2.2 describes the functional components of the prototype. Section 2.3 describes the extended interfaces of the prototype including the user interfaces for both the website and mobile applications.

2.1 Prototype Architecture

Strome Infusion's database will be populated with data generated by its team members and the SEC Director Nancy Grden. The virtual servers will include an Nginx web server and a PostgreSQL database server. These servers will both be hosted on an ODU CS Department virtual machine, as shown in Figure 1.

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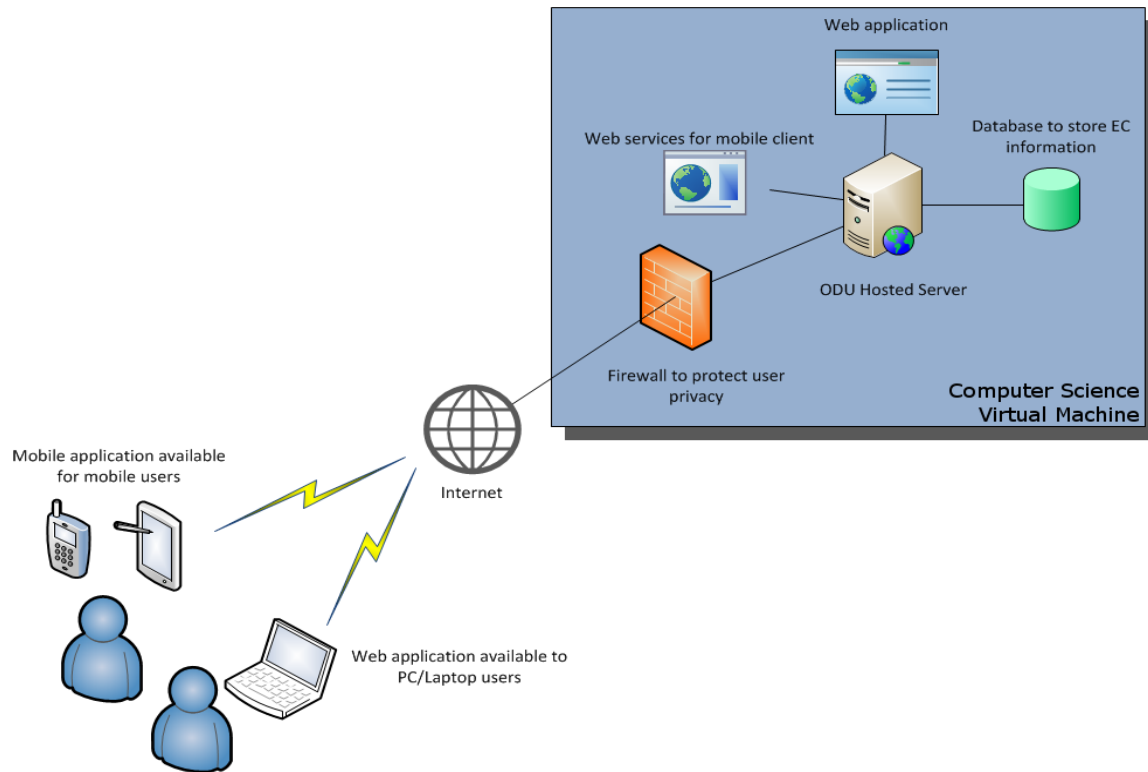


Figure 1. Major Component Diagram

The prototype's database will use the same database management system (PostgreSQL) that will be used by the final product. The primary difference between the prototype's database and the final products' will be that the prototype's database will have data generated exclusively by Director Grden and the Strome Infusion team.

The prototype's web application will have all of the same features as the real product. All user account data will be generated by the SEC staff, Director Grden, and the Strome Infusion Team. All other data used to test the prototype will be simulated. Information on how a user can navigate and use the website is shown in Figure 2.

The prototype's mobile application will have all of the same features as the web application, and will be developed exclusively for Android OS. Information on user navigation and usage of the mobile application is also shown in Figure 2.

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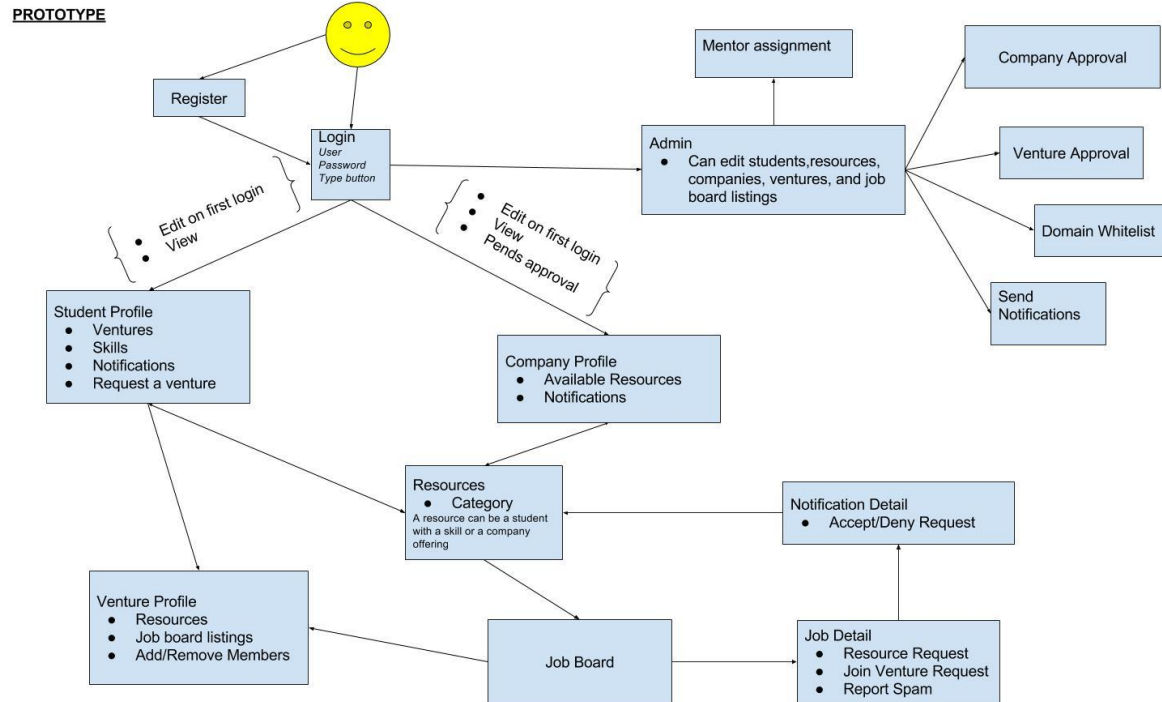


Figure 2. Prototype Site Map

The virtual machine that the prototype will be hosted on will be an Ubuntu server. This will run the database, web server, and web services for the mobile client.

2.2 Prototype Functional Description

The web and mobile applications for the Strome Infusion prototype will manage information for four different types of users including Guests, Resources, Project Owners, and SEC Staff. Figure 3 shows an overall process flow of the website concerning the different types of users for the web and mobile applications.

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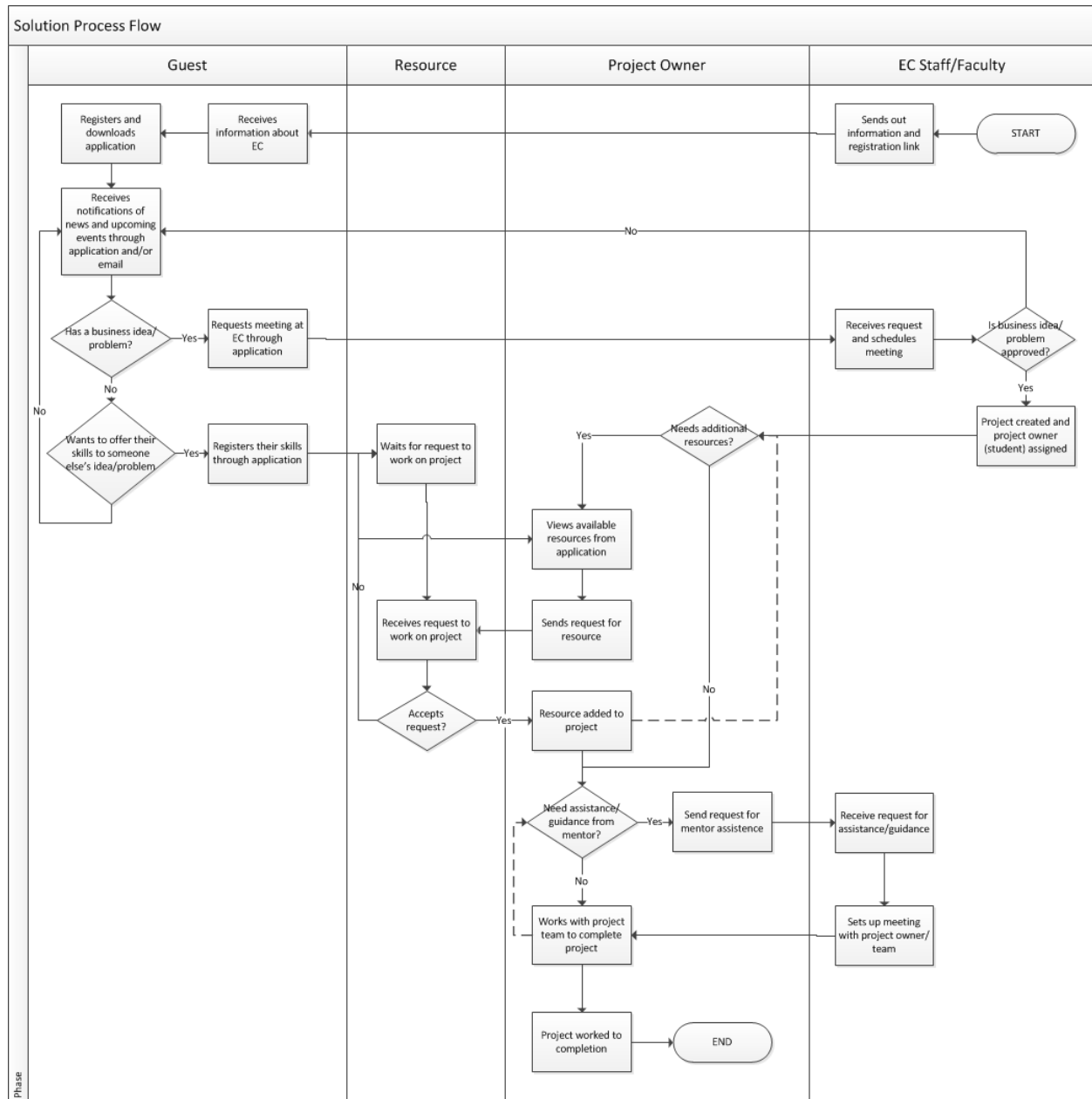


Figure 3. Solution Process Flow Diagram

When a user tries to create a new account, they will go through an authorization process. Once a new account is registered, the account's email address is compared against a preapproved list of email addresses to confirm that the account is registered by an approved user. The user registration process can be seen in Figure 4.

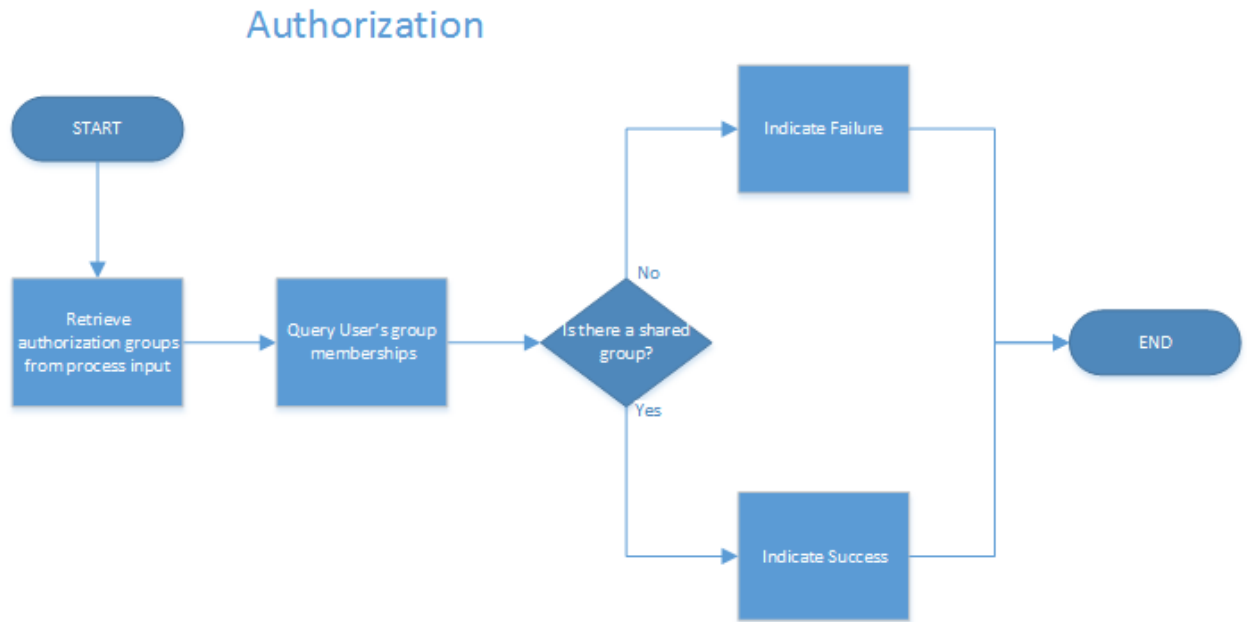


Figure 4. User Registration Process Flow Diagram

Once a user has registered their account, they will be able to edit their profile information, request meetings with SEC staff, and apply to create a profile for a venture or a company outside of the ODU.

A user can set up a meeting by selecting a time from a calendar of available times. Once a meeting is requested, it must then be approved. When the meeting is approved/disapproved, the user will then be notified by email concerning the SEC staff's decision. This process is shown in Figure 5.

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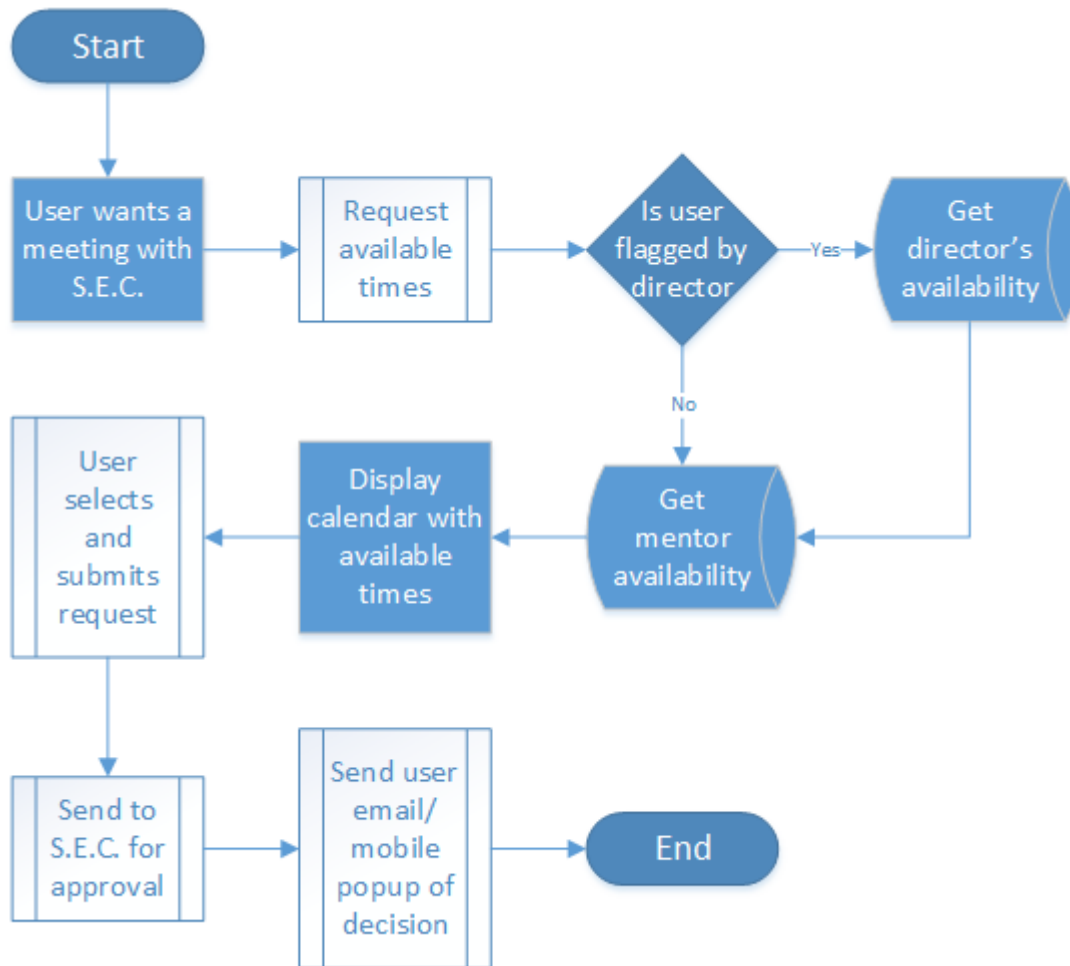


Figure 5. Meeting Request Process Flow Diagram

A user must be preapproved to have a venture or company profile page. If a user is approved for one of these profiles, they will be able to access it from their user profile page. The user registration process for a venture or company profile is shown in Figure 6.

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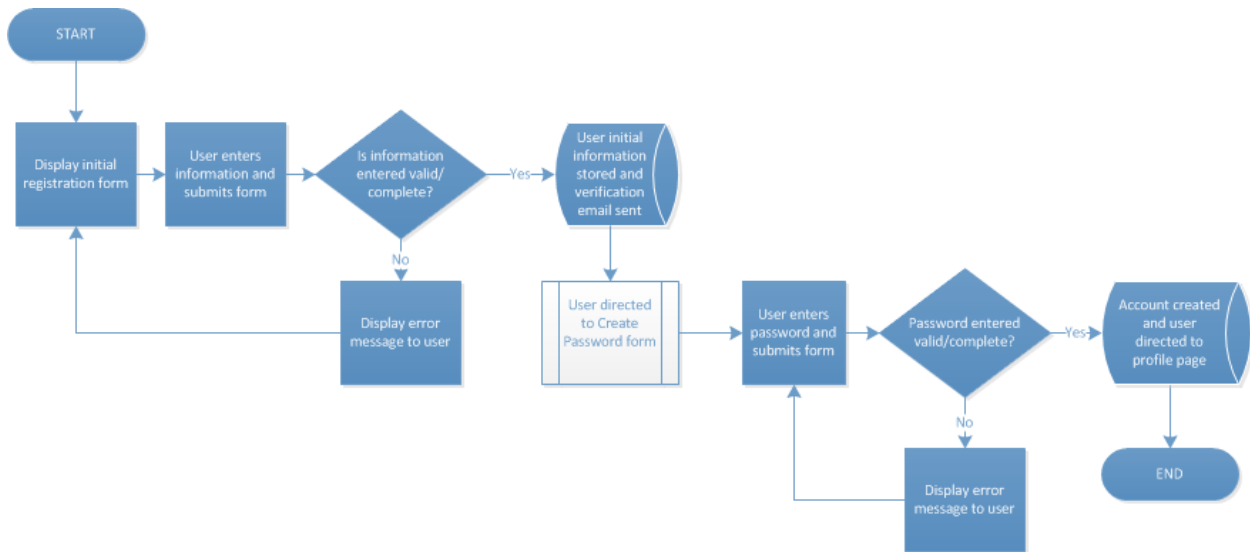


Figure 6. User to Venture/Company Authentication Process Flow Diagram

If a user has a skill or a venture is requesting a skill, they will have the option of using the job board. The Job Board will users to see ventures seeking the skills they have, and ventures to see users with the skills they want. Users and ventures will both be able to send requests to the other for connections. When a user approves a request from a venture, or vice versa, the user will become a member of the venture. This process can be seen in Figure 7.

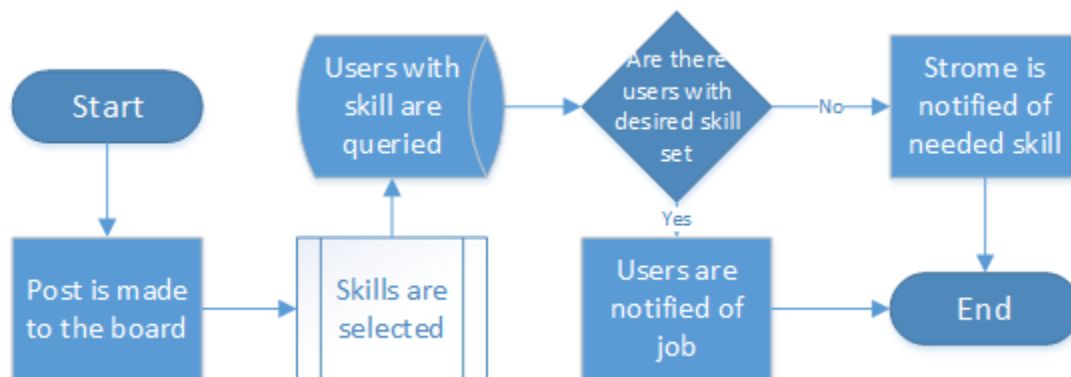


Figure 7. Job Board Process Flow Diagram

The prototype's mobile application will have all of the same features, and the same appearance as the web application. It will be able to achieve this through the use of Apache

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Cordova. The mobile application will also be able to push notifications to its users. When a user receives a message on their user profile, a push notification will be sent to them. The push notification process is shown in Figure 8.

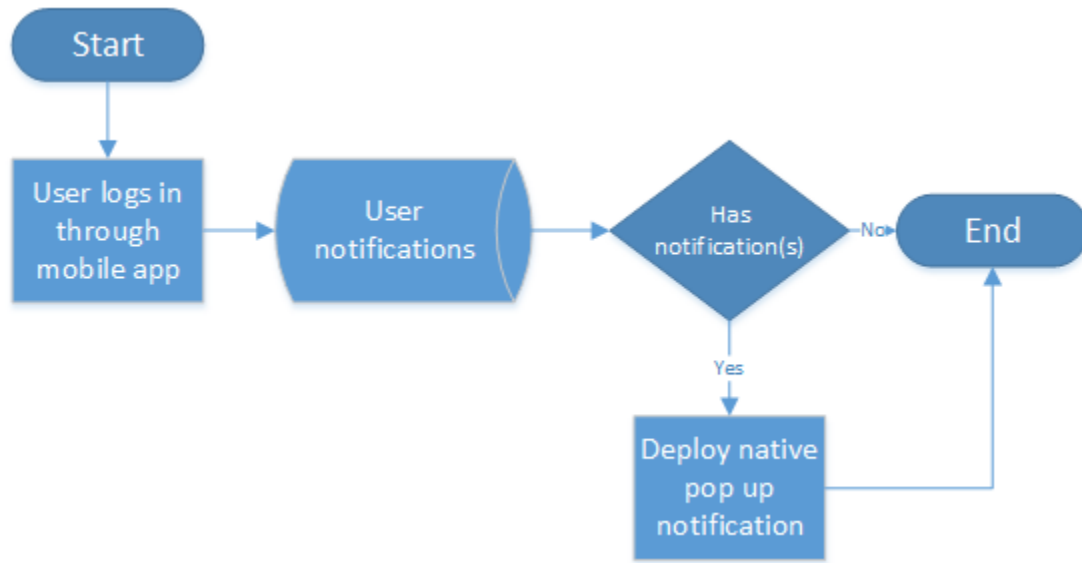


Figure 8. Mobile Application Push Notification Process Flow Diagram

2.3 Extended Interfaces

The Strome Infusion GUI will use an adaptive framework that will allow the desktop browser, mobile browser, and mobile application versions to all be created in a single development cycle. A proposed landing Page for the Strome Infusion web application can be seen in Figure 9.

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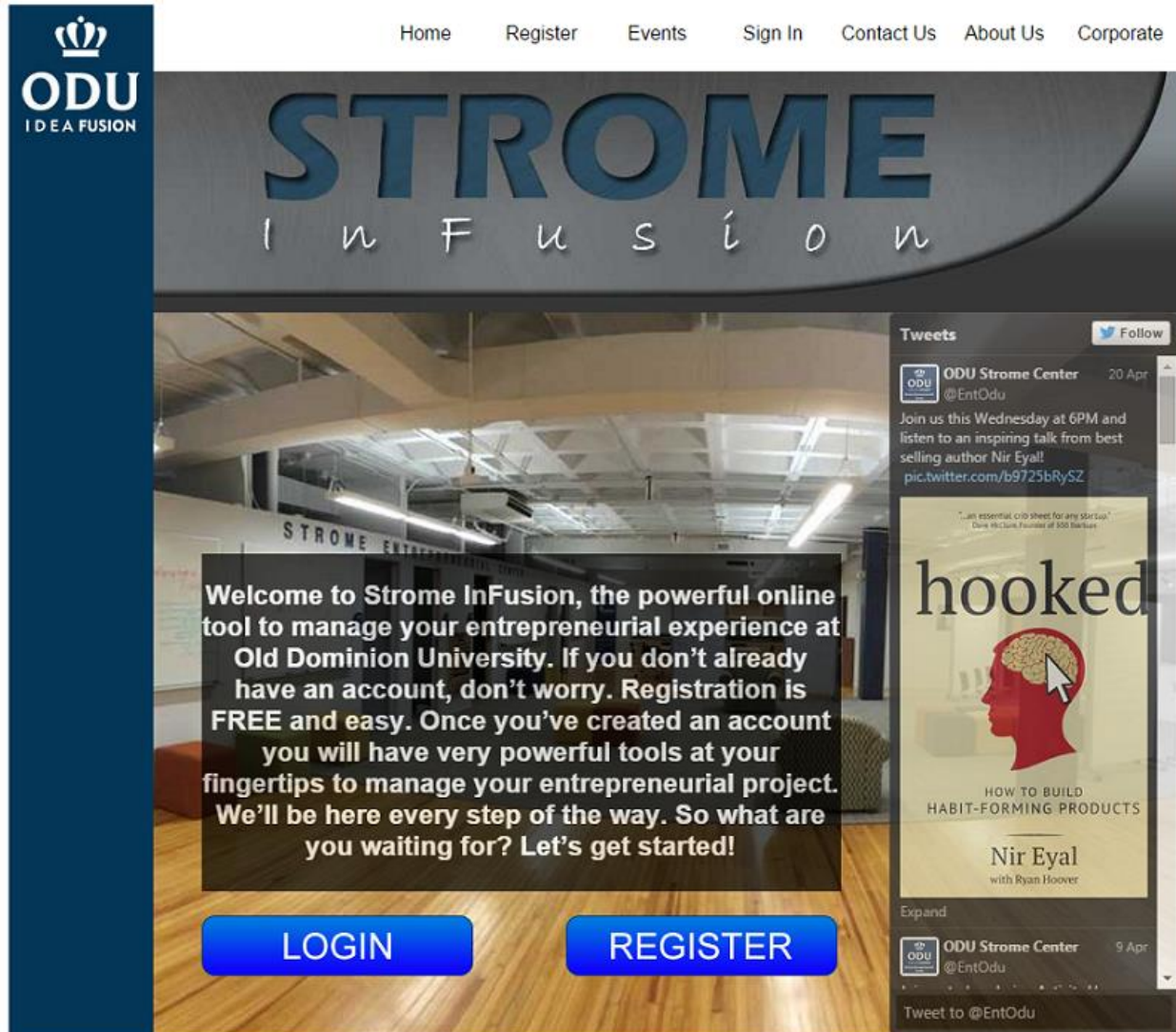


Figure 9. Landing Page Mockup Design