Lab 1 - Strome Infusion Product Description

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1. INTRODUCTION

Old Dominion University (ODU) believes that students can make a positive impact on the regional economy and have a lucrative career by being an entrepreneur. To support this idea, the Strome Entrepreneurial Center (SEC) was established to enable and encourage students from any discipline to explore a new or existing business venture. The center was made possible by the generous support of Mark Strome who graduated from ODU in 1978 with a bachelor's of science in engineering (Little, 2014). His application was initially rejected by the college but through some convincing from his father he was eventually accepted (Vair, 2014). He went on to receive his master's degree in economics from the University of Berkley in California (Little, 2014). By1992, he had started his own business called Strome Investment Management which became a multimillion dollar investment firm (Little, 2014). Later on, in 1995, with the help of his wife Tammy, the couple set up the Strome Family Foundation which supports local programs with a primary emphasis on education, arts, and research (Vair, 2014). In 2014, to give back to the University for deciding to accept him, the foundation donated $11 million to ODU to promote the entrepreneurship spirit amongst the campus community (Little, 2014).

SEC provides guidance to students who need assistance with an existing business or the implementation of an entirely new business idea. To achieve this, they offer the following services to ODU students: guest speakers, workshops, one-on-one consultations, internships, mentoring, and SEC sponsored contests. However, communicating these resources to the campus community has been a challenge. Currently, the only methods the center has for reaching out to students are face-to-face meetings, clubs, ODU public relations, and "word of mouth" through faculty and staff.

Also, once students are aware and engaged with the center, there is no automated way to connect students with the resources they need to achieve their business goals. Team Black of CS411 will attempt to resolve these challenges by developing a software solution called Strome Infusion (SI).

2. STROME INFUSION PRODUCT DESCRIPTION

SI will allow the SEC to easily connect with students by having a very basic registration process. Once users are registered they will receive updates and announcements from SEC. SI will facilitate the collaboration between students and internal and external resources. The system will consist of two main classes of users: company owners and resources. Company owners are the individuals with the business idea. They will essentially be project managers who will initiate, coordinate, and guide the project to completion. Resources will assist the company owners with their registered skillsets, previous experience, or financial support and can take many forms including but not limited to fellow students, SEC staff, external mentors, and external investors.

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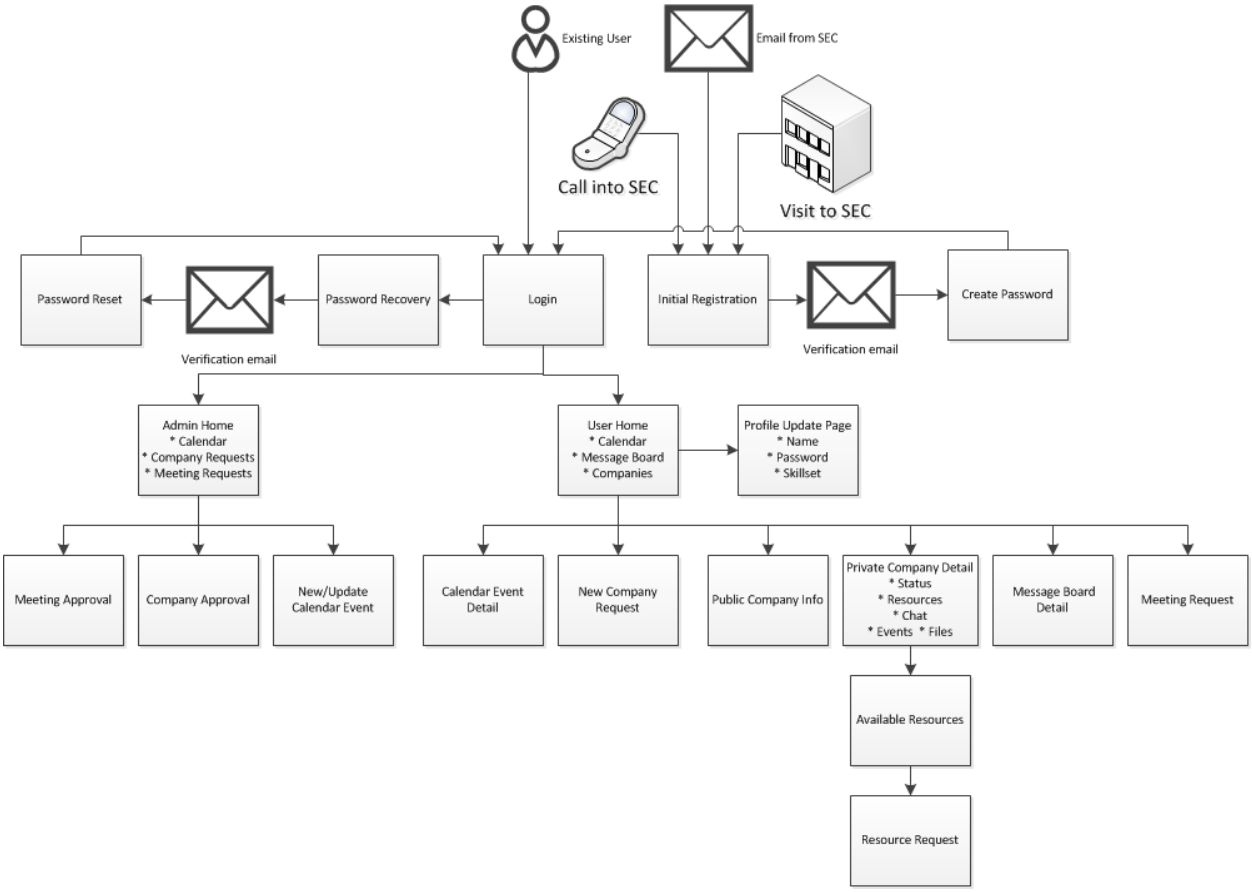

Figure 1- Strome Infusion Web Application Site Map

2.1 Key Product Features and Capabilities

The SI registration process will be quick and easy. The only information required for initial registration will be a name and a valid email address. Once users are registered, they will receive information about upcoming SEC events, workshops, guest speakers, internships, and SEC sponsored contests via email or notifications on their mobile device.

If a registered user has a business idea or needs help with an existing business, they can request a company. Once the company has been approved by SEC staff, the user will be able to publicly share information about their venture to attract investors or individuals who are

interested in working on the project. Some information may need to be private and available only to those individuals working on the project so that will also be an included feature.

Company owners will have the ability to post what resources they need on a job board much like the "Help Wanted" ads in a newspaper. Registered users will have the ability to search the job board and send a request to the company owner to join the project. If the company owner accepts the user's request, then the user will be added to the company and will be able to collaborate with the company owner and other resources through chat and file sharing. To expedite the connection process between company owners and resources, communications will not be limited to a one-way process. Company owners will also be able to view a list of available resources and their corresponding skillsets and send a request to have the resource join the project.

SI will give SEC staff a view of all of the entrepreneurial projects that are in progress. This will allow them to provide guidance to students any way they feel necessary. For example, if they see a need to manually make a connection between a company owner and a resource they will have that ability. If they notice that a project is not moving forward they will be able to reach out to that company owner and offer their assistance.

Since SI will contain some potentially sensitive data it will include an authentication system that will be up to date with today's standards in web security. The system will have the option of integrating with existing authentication systems since most companies already have them in place. In ODU's case the final product will integrate with Shibboleth and be available from the student's personal portal. Figure 2 shows to work flow for the proposed solution.

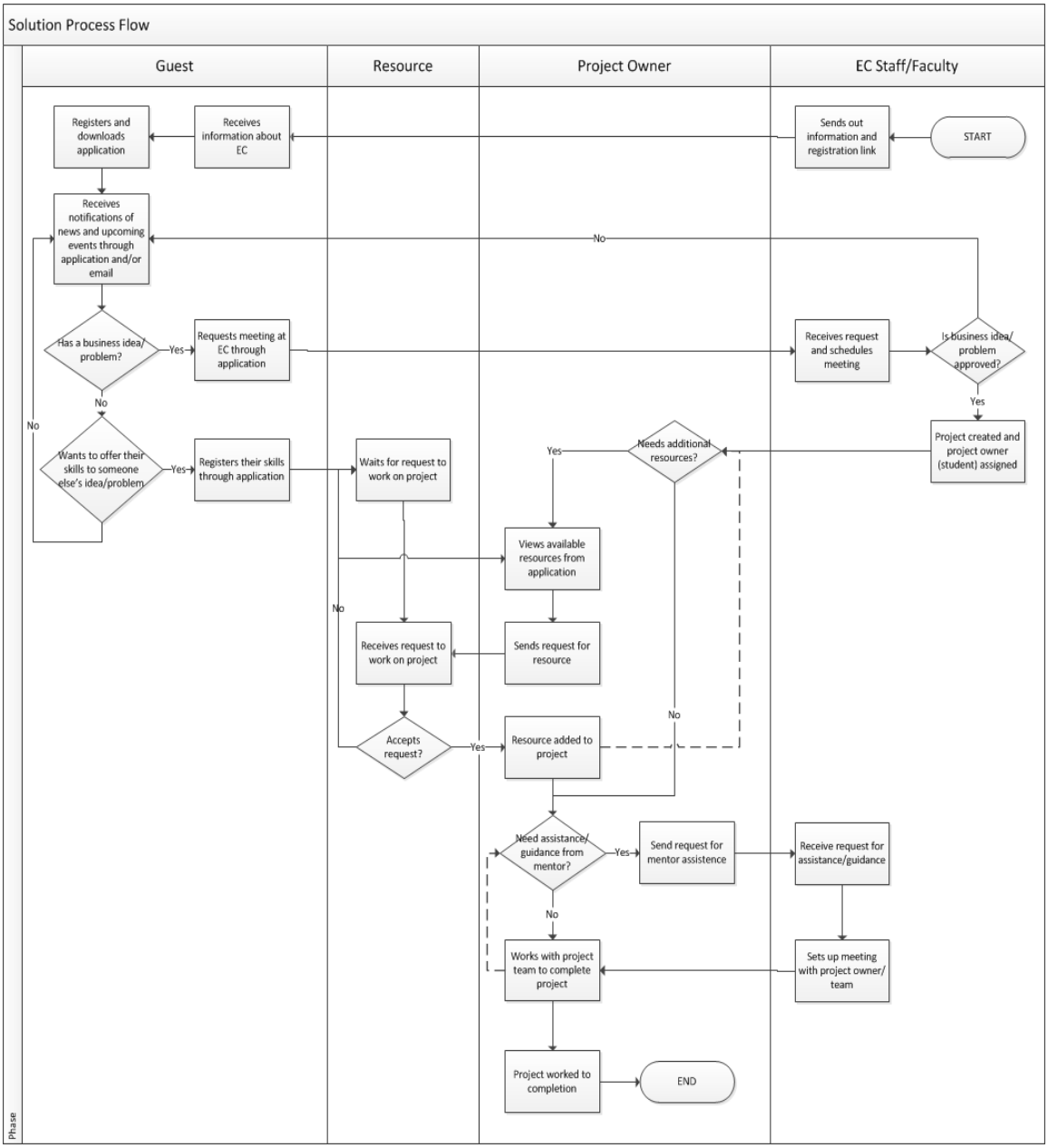

Figure 2- Solution Overall Process

2.2 Major Components

SI will be a web-based software system that will consist of the following software components: a web application, a mobile application, and a database as illustrated in Figure 3. The front-end web application will be written in Javascript and leveraging the AngularJS

framework for most of the components such as buttons and textboxes. This will expedite the development process by not having to code the GUI components from scratch. The API services will be developed with Python leveraging the Flask framework. This approach will also reduce the development time because both the web application and the mobile application can utilize the same API. The mobile application will be developed with Apache Cordova. Both the mobile and the web applications will have the same functionality but will give users the option of accessing the system from a computer at home or a mobile device on the go. PostregSQL will be the database technology used to store information such as user profiles, company profiles, resource skillsets, and messages. The software chosen for the application was based on the fact that they are open-sourced and don't require any licensing fees. For hardware requirements, a web server running NginX will be required to host the web application and API calls. Another component called uWSGI will be installed to load balance the API calls which will make the application more responsive to the end-users. A database server will also be required to host the database. Since user privacy is always a concern and SI will be a public facing application, a firewall is recommended to filter all incoming requests.

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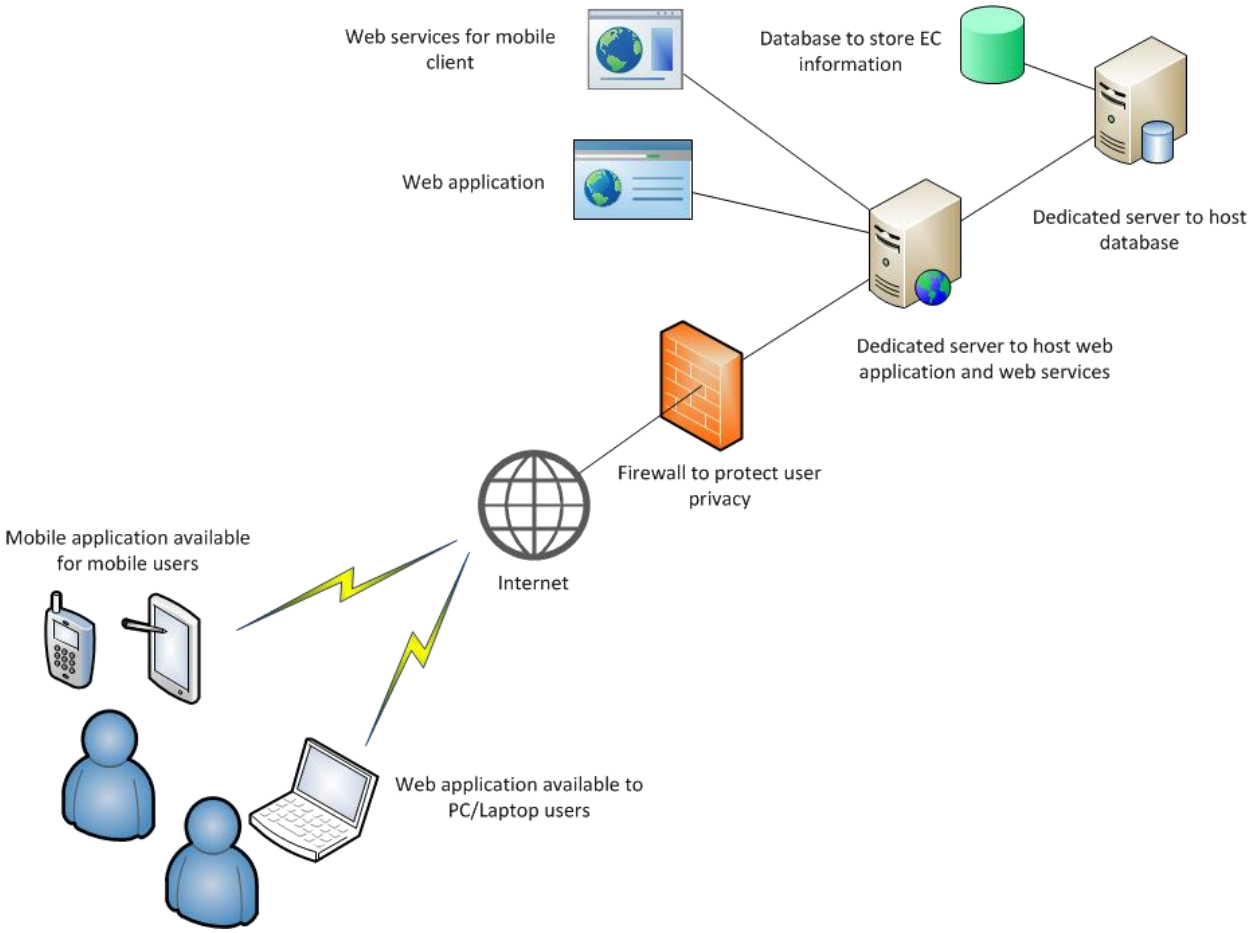

Figure 3 - Hardware and Software Diagram

3. IDENTIFICATION OF CASE STUDY

Figure 4 illustrates the current SEC process and highlights the challenges in red. The first challenge for the SEC is their ability to reach out to students to make them aware of this valuable resource. There is some general information and an events calendar available on the ODU website; however, this has historically been less than adequate for meeting the center's outreach goals. To address this issue, SI will give the SEC the ability to send out emails informing students of its existence and purpose. The emails will also include a link that will allow students to register so that they can receive notifications about upcoming SEC events.

The next challenge has been the inability of the SEC to keep track of the students that need the assistance of the SEC. The SEC contracted a third-party vendor to develop a website called Venture Hive to collect student information; however, the registration process was cumbersome and overwhelming. Because of this, there have only been a limited number of registered users according to Nancy Grden, who is the current executive director of SEC. The initial SI registration process will only require a name and valid email address.

Another challenge is the ability to connect students with resources, community partners, and investors. Once users are registered with SI, they will have the ability to create individual and company profiles. Users who do not have a specific business idea can register as a resource and contribute their skills, prior experience, or financial support to the project.

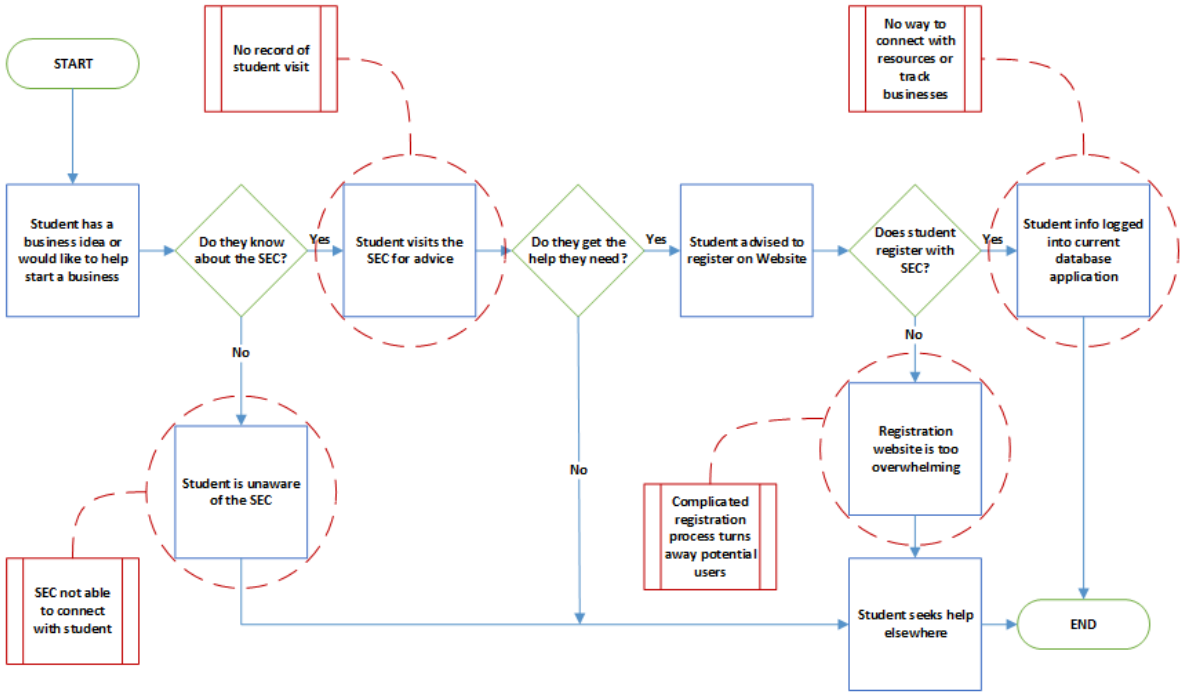

Figure 4 - Current SEC Process

SI will measure its success based on how it addresses these issues. One such metric will be the number of users enrolled. If this number exceeds the total number of registered users in the Venture Hive system, it will be a good indicator that the system is reaching more students. Another good indicator will be the number of new ventures that are created after SI is implemented. There will be no baseline to compare this to so it will be ultimately up to Nancy Grden's expectations to determine if the goal has been met. Lastly, positive user experience with the product can be measured by conducting surveys. It is desired to provide a positive user experience so that users will use the product more.

4. STROME INFUSION PRODUCT PROTOTYPE DESCRIPTION

The purpose of the prototype is to demonstrate how SI can benefit the SEC so that Nancy Grden can decide if she wants to implement it. Table 1 highlights the differences between the prototype and the real world product.

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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 - Prototype vs. Real World Product

4.1 Prototype Architecture

For the prototype, the architecture will basically mimic the real world product with a couple of exceptions. Figure 5 shows how the dedicated web server and database server will be replaced by a virtual computer provided by ODU.

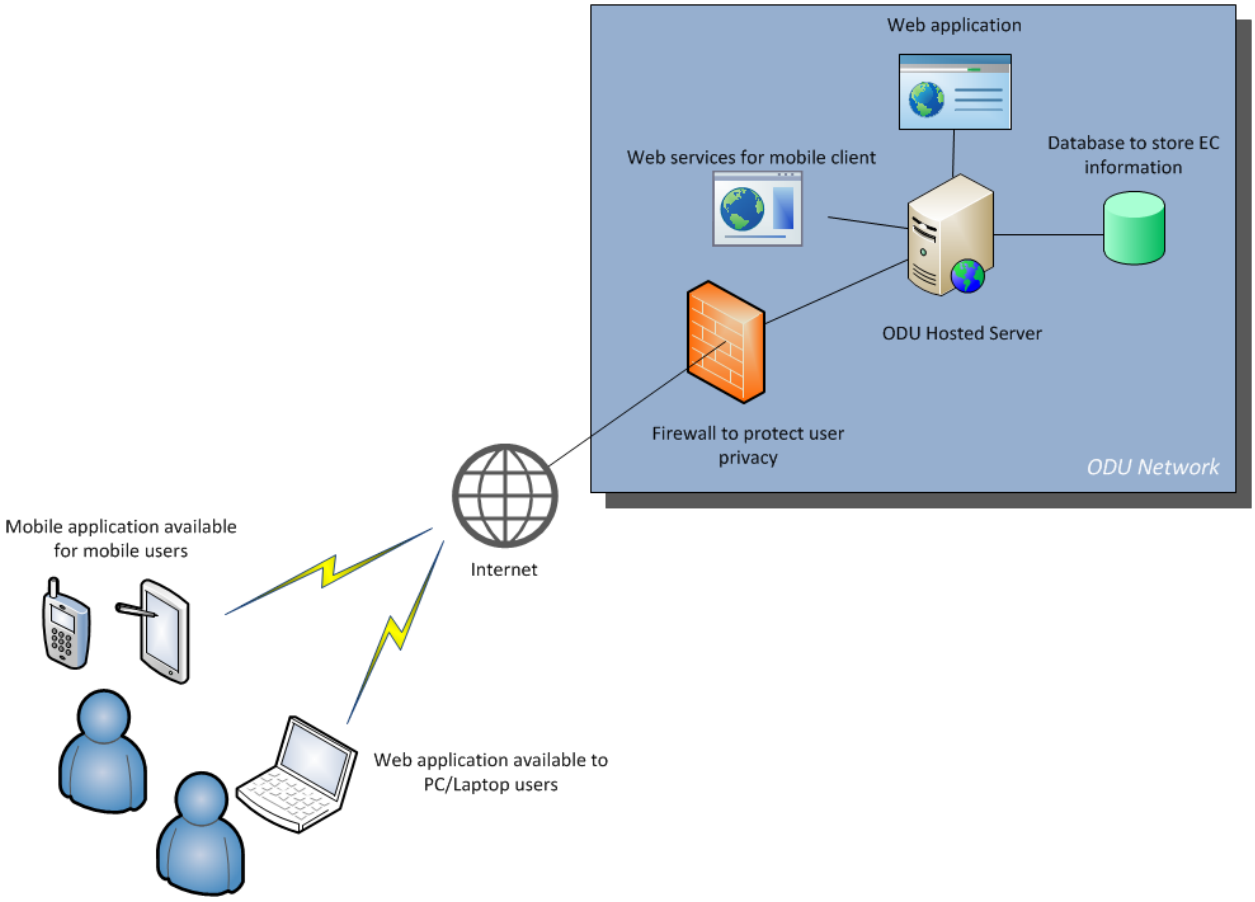

Figure 5 - Prototype Architecture

4.2 Prototype Features and Capabilities

The first feature the prototype will demonstrate is that is has the ability to register users. A student will be simulated filling in the registration page and submitting it. Shortly after, the student will receive an email verification in which they click the verification link. Once the

student receives confirmation, their information can be retrieved from the database to confirm that they were successfully registered. After registration is successful, a test message will be sent out and the user should promptly receive it both via the registered email and on the mobile device.

The next feature demonstrated will be a student's ability to register as a resource and specify their skillsets. There will be a limited number of skills available in the prototype but will be enough to demonstrate the functionality. Once the skills are registered they can be confirmed by doing a search on available resources and verifying that they show up. They will also be able to send a request to a company owner to join a project. The request will be approved by the company owner and notification sent back to the resource.

The process of requesting a company will also be functional and demonstrated. A student will fill out the required fields to request a company and submit it. A simulated SEC staff member will receive the notification by email and log into the system to review the request. Once the request is approved the student will receive confirmation via email.

Finally, the job board will be demonstrated. Once a student is approved for a company they will have the ability to post requests for needed resources. They will fill out the request and submit it and immediately verify that it is indeed showing up on the job board. The simulated resource will click the job posting and request to be added to the project.

4.3 Prototype Challenges

The main challenge of the prototype design will be ensuring that GUI is user friendly and follows a logical flow. If the interface is cumbersome and hard to follow, users may be discouraged from using it and will defeat the purpose of the software. Another factor for the

interface is responsiveness. If the user finds the interface too slow and time-consuming it will also discourage them from using it. This could be a result of network issues, poorly designed code, or the software chosen to develop the product. Scalability may also be a challenge. A large volume of users accessing the application at the same time could potentially cause bottlenecks in the application stack which could result in performance degradation. There will be load balancing software included in the product to address this concern; however, finding a large number of test users to test the system concurrently may be a bit of a challenge.

In this day and age, security is always a concern. Since the application could potentially store intellectual information about external companies, keeping the application secure is a top priority. Taking the necessary precautions such as encrypting passwords in the back-end database and using best practices when authenticating with the API should alleviate this concern.

5. APPENDIX

5.1 Glossary

API – stands for application program interface and is used to interact with an underlying software system.

AngularJS – a javascript library that contains pre-written components to minimize the amount of code that would have to be written from scratch.

Encryption – encoding information in a way that is not readable except by authorized entities.

Firewall – software that prevents hackers from gaining access to systems with sensitive data.

Flask – a framework that is based on the Python scripting language.

Javascript – a scripting language used for web development.

NginX - web server technology that runs web applications written in Python.

ODU – stands for Old Dominion University.

Open-Source Software – software that is developed by a community of programmers that is available to use without any licensing fees.

PostgreSQL – open-source database software for storing data.

Python – a high-level programming language that allows programs to be developed with fewer lines of code when compared to other languages such as C++ or Java.

SEC – stands for Strome Entrepreneurial Center who is the customer that the product is being developed for.

SI – stands for Strome Infusion and is the product that is being developed.

uWSGI – stands for web server gateway interface and is a software component used to direct calls from the web server to the API for applications written in Python.

5.2 References

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