Lab 1 – Strome InFusion Description

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1 INTRODUCTION

The Strome Entrepreneurial Center (SEC) at Old Dominion University exists to serve the entrepreneurial community by enabling new ventures initiated by members of the university. The center opened in 2014 after a generous $11 million donation from Mark Strome, an ODU alumni from the class of 1978 who wanted to give back to the school for "taking a chance" on him (Council, 2014). The center provides the community with regular workshops, networking events, individual advising in association with local experts in the industry, and other innovative resources that can assist entrepreneurs.

Students with a business idea can contact the center to help them fill resource gaps in their projects by visiting the SEC. They are then advised to register with Venture Hive, which is used to collect and manage this information. There are several problems with this process that can cause a student to not make it through the registration. There is not a record of in-person visitors to the center causing them to be easily overlooked. To collect a visitor's information they have to register on Venture Hive, which has a complex initial signup consisting of 20 form fields, 11 of which are required. This initial complexity makes it less likely that a visitor will complete the process. Once they are registered, there is not a clear online system for matching the entrepreneur with needed resources and instead requires that the staff make these connections. The complexity and lack of clear resource availability has resulted in only a handful of registrations. The SEC seeks a solution that will simplify the registration process for end users, provide immediate value to new signups, and enable them to establish lasting connections. Strome InFusion meets these goals with a streamlined web service that student can interact with throughout the duration of their venture.

2 STROME INFUSION PRODUCT DESCRIPTION

Strome InFusion is a custom management platform for entrepreneurial centers in order to help them achieve their outreach goals. The CS 410 Black team designed it to assist with the conversion of

individuals into entrepreneurs by helping them find and stay connected with resources. Strome InFusion targets the relationship between the entrepreneurial center and its visitors to amplify the value of the center to its visitors.

2.1   Key Product Features and Capabilities

Strome InFusion is a web application that is suited to the high pace of entrepreneurship by being user friendly on both mobile and desktop devices. The streamlined registration process requires that users enter a bare minimum number of fields to connect with the center. Visitors to the site will be able to see some of the available center's resources that are being publically offered and once registered, will be able to request those resources for use in their venture. The product offers the administration with tools to curate the center's ventures, users, and resources.

2.2   Major Components

Strome InFusion fits into the existing process of entrepreneurial centers by replacing several problematic components with customized software. See the circled elements of Figure 1 for the parts of the process that are currently problematic for users. User visits to the SEC can be logged by the user direct or by having the staff collect and enter user's information on their behalf. A newly developed form that can be completed by a visitor in a few minutes from their phone will replace the current registration form. The form will be short enough that they will be able to register before they leave if they happen to be visiting in person. Once the student is registered, they will stay engaged with resources and businesses that are connected with the Strome Center.
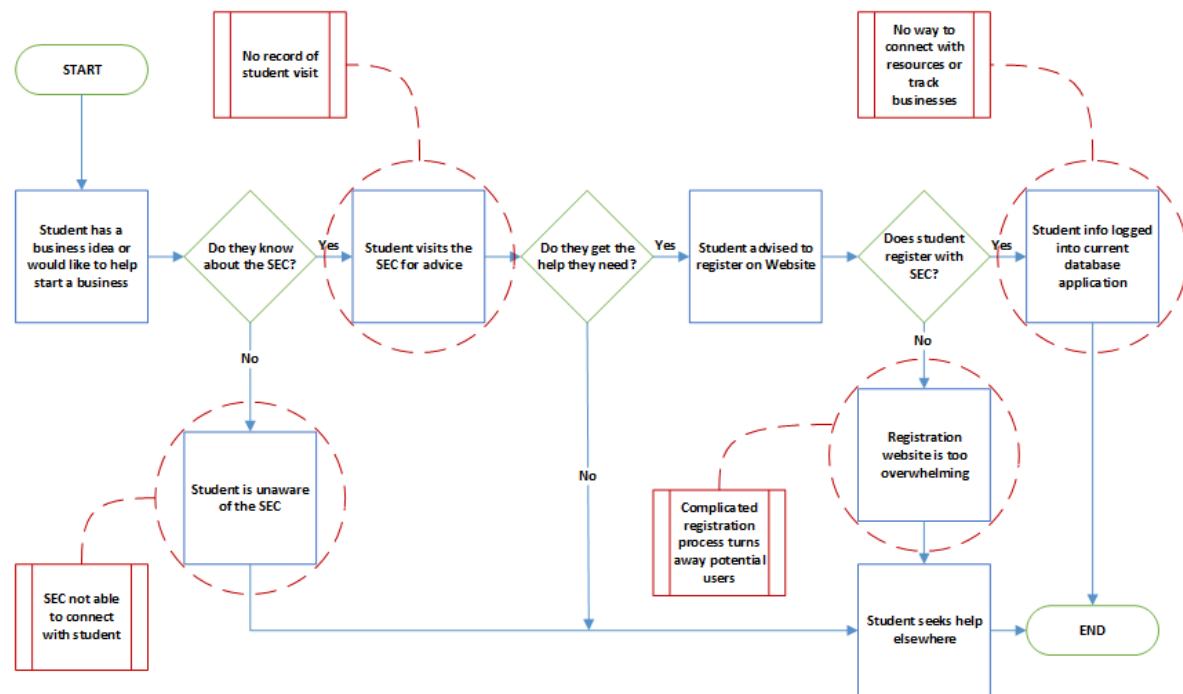
Figure 1: Current Process & Pain Points

3 IDENTIFICATION OF CASE STUDY

The product is being developed for the Strome Entrepreneurial Center at Old Dominion

University. Its primary users are the students who visit the center and are interested in

entrepreneurship, the center's administrators, individual volunteers, and companies who provide

assistance to the Strome center. The SEC provides many services that could help more members of the

community that are not currently being reached. By making an easier registration process for students

and businesses to collaborate, the center will be capable of establishing more relationships with

students whom the center may have otherwise not made contact. In addition, by making it clear what

student ventures need to succeed it will be easier for staff to connect those students with resources.

The prototype will be considered a success if it achieves a higher number of registrations and

interactions with students than the existing solution provided by Venture Hive. In the future, this

software application suite could be provided as a white label solution for other entrepreneurial centers

to help them meet their outreach goals.

4 STROME INFUSION PRODUCT PROTOTYPE DESCRIPTION

The Strome InFusion prototype website will supplement the existing Strome entrepreneurial

center website with dynamic content and content that requires user authentication. The prototype

consists of several components that work together to support a single cohesive service. The major

components of the architecture include a website, mobile application, web service, and database. See

Figure 2, which is a map of how these parts are related. Users can work with the application through

either the website or downloadable mobile application. A mobile application is used to provide

functionality that would not be available with website.

4.1 Prototype Architecture

The web application is hosted on an Ubuntu Linux server. The website is a single page web

application built using AngularJS (JavaScript based web application framework). The web application

makes RESTful HTTP requests to a web service to load user specific information and other dynamic

content. Because the application is built as a single page AngularJS application it will also be able to be

packaged using Cordova to provide a native mobile user experience. The server includes the server

software WSGI to serve those HTTP requests for both web pages and RESTful data. Flask, a python micro

framework, is used on the server to assist in servicing the HTTP requests. The web service interfaces

with the PostgreSQL database which stores a structured copy of all of the content generated by users.
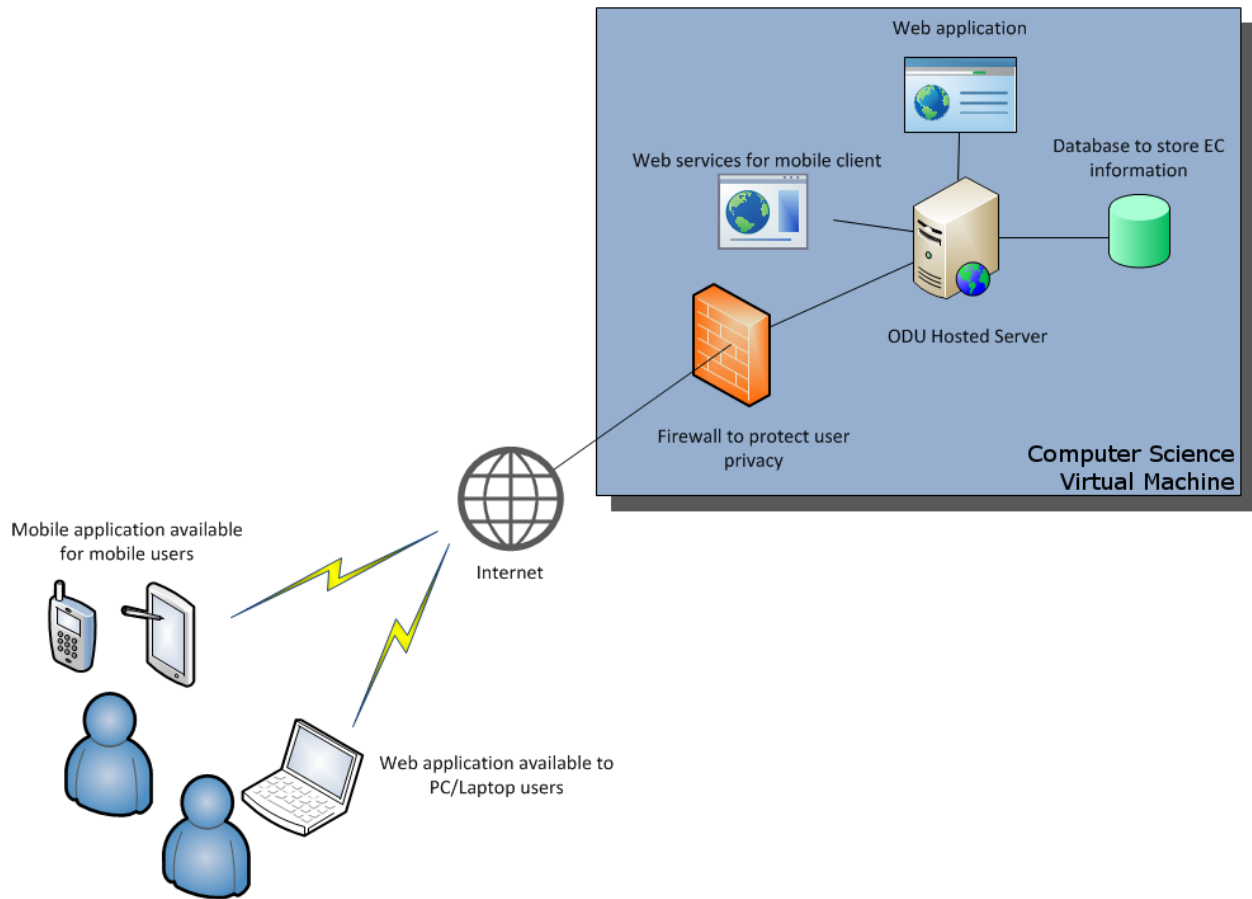
Figure 2: Application Architecture

4.2   Prototype Features and Capabilities

Feature	Real World Project	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

Figure 3: Feature comparison of full product and prototype

Users of the website have the capability to register or login to an account. There are three primary roles with different abilities; users can have one or more of these roles. The center's staff approve a user's rolls in order to grant them access to specific components of the system. Prior to a role being approved the user can see an immediate preview of the resources affiliated with members of the center.

Students are able to create a new venture, offer their skills to an existing venture or request meetings with SEC mentors. Once the SEC staff approve a student's new venture they can also then request specific resources, and update information about their venture. If a request does not target a specific individual who is offering a resource then it is placed onto the job board, which lists all open requests and offers. External companies frequently work with the Strome entrepreneurial center in order to provide their resources to new student ventures. An external company will have the ability to post about their resources to indicate how they can help student ventures. An external company can

also maintain a listing of its own profile with information to provide supplemental information to students who might seek their assistance.

The entrepreneurial center staff role is specifically for employees of the Strome Entrepreneurial center and has administrative capabilities. Staff members can send notifications to members. They are also granted the ability to approve or deny new signups, and maintain current lists of external mentors. Staff can manage key words associated with the search for resources provided by both students and companies. Lastly, they are able to approve and provide additional information about meetings between students and the center's team of mentors. An overall administrator role allows the center to send general system notifications to all users. The administrator is empowered to add, delete, enable or disable user accounts, companies, change signup requirements of roles, and has all of the other abilities of staff members.

4.3   Prototype Development Challenges Features

A number of challenges and risks must be overcome during development of the Strome InFusion prototype. The greatest challenge is certainly the development of the application which requires a broad set of disciplines to be fully executed. In order to remedy that the languages and frameworks being used have been chosen for their low barriers to entry and the development team is able to lean on many established existing skills. Another challenge is the timeframe for completion of the development, which will be mitigated by careful time management, and equal distribution of work to a relatively large team of seven developers. A risk to the success of the prototype is whether or not the customer likes the solution since if they do not it will not be used. To mitigate this we will work closely with the customer throughout the development process.

GLOSSARY

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 JavaScript.

Apache Cordova: A set of device APIs that allow a mobile application developer to access native device functionality.

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.

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

Concurrency: Allowing multiple processes to go at once.

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

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

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

Database: A structured set of data held in a computer, especially one that is accessible in various ways.

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.

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.

Flask: A python web application framework.

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

GUI: The graphical user interface is an interface that allows the user to interact with the application.

Horizontal Scaling: Expanding a system's capacity by adding servers to a cluster on the fly.

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

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: An open sourced operating system based off UNIX.

Linux distributions: Operating systems based off the Linux kernel.

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

performance.

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

system.

MVC: Model view controller is an architectural pattern for building applications.

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

phone).

Nginx: A web server.

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.

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

Operating system: The software that supports systems basic functions (i.e. launching applications and

handling peripherals).

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

Python: An object oriented 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.

SDKs: Software development kits are sets 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.

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.

Toolkit: A set of software tools.

Ubuntu: An open source operating system based off Linux.

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

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.

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.

WSGI protocols: The web server gateway interface, it is a specification on how a web server communicates with web applications.

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