**Capstone Report Cover Sheet**



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| **Capstone Project Name:** | **Bar Fly – Social Media in Bars** |
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| **Degree Program:** | **Bachelor of Science, Software Development** |
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# Introduction

Johnny’s bars and fine dining (Johnny’s) owns a chain of bars and restaurants. Johnny’s wanted a mobile application (app) to be built that created an in house version of social media in their bars. The mobile app was called Bar Fly. The owners of Johnny’s had noticed that due to their recent rise in popularity some customers would not order drinks due to the size of the lines. Johnny’s had an order feature built into the application to decrease lost revenue from people avoiding the lines. Johnny’s hired the mobile application firm of Silent Studios Media Group (Silent Studios) to design and develop the application. Silent Studios was also hired for long term support of the application, including such activities as server monitoring, analytical data monitoring, and general support for the application. The long-term contract did not include application upgrades which will be on an individual contract basis. To keep server maintenance to a minimum Johnny’s and Silent Studios had decided to house the server-side aspect of the application on a cloud-based server.

Silent Studios developed the application on the Android Studio IDE since the initial application runs on android devices. The application was developed in Java which aided in the communication with the server-side program that was also written Java. Silent Studios also created a website for Johnny’s employees to log into and monitor the bar chat and take orders. The website was written in HTML5 and utilized a database written in MySQL.

Johnny’s required the application to allow customers within 30 feet of their bars to be able to access the apps community features. These features included a group, and a private chat. Customers outside of the 30 foot constraint cannot add to the conversation but can set a favorite bar and view the conversation anytime. The application also provided the customer the ability to order and pay for drinks. The customer receives a notification once the order is fulfilled and can pick up at the designated area of the bar. The bar managers can post drink specials, and special events on the website interface and it is displayed in the application. Customers are required to create an account through the application for their profile.

The project consisted of several phases the first was requirements gathering. During the first phase Silent Studios meet with Johnny’s owners and discussed what was wanted and what was required for minimal functionality. Silent Studios found that the project required a website, database, application, a server side application, and service through a cloud based server. Once all requirements had been gathered Silent Studios moved into the planning phase. During the planning phase Silent Studios decided that the project needed to run under the agile scrum methodology which consisted of several sprints. The phase also delivered a schedule for each requirement, and a plan for the order of requirement development. Silent Studios planned release for the 22 of April 2018 which was met.

The next phase was the development phase which consisted of several sub phases. The sub phases were the development of the server side application, the database, the mobile application, and the management website. The server side application was developed using Java within the period of five days. The database was developed in MySQL and fell within three days two days less than the scheduled five days. The mobile application was originally scheduled for a 12 day period but ended up being 14 days due to testing and extra sprints. The management website was scheduled for a five day period but ended taking two days the remaining two days fell to testing and additional sprints for refinement of the systems.

The project successfully developed an app that could provide chat and ordering functionality to customers of Johnny’s. The project did complete with the estimated timeline experiencing few issues and deploying on time.

# Review of Other Work

Johnny’s Bars and Fine Dining decided to implement a more refined approach to the acquisition of younger customers. Johnny’s noticed that many younger customers tended not to order when there was a line longer than usual. Johnny’s found this to have a significant negative impact to revenue. A study conducted by Rioux, Bernd, & Leclerc, (1989) found that customers were more negatively impacted by a delay prior to service than in the middle of service (pp. 59-63). This meant that when the customer is delayed prior to drink service they were less likely to return. Based off this study Johnny’s decided to lower the negative results by introducing an ordering feature in the app.

The primary function of Johnny’s app was the social aspect of chatting with others that would be currently in the vicinity. The app was more focused on the formation of secondary groups rather than primary groups. Academy, (2018) wrote that secondary groups are more anonymous and impersonal they tend to be short term and based on shared interests; over time they may turn into primary groups (Academy, 2018). Secondary groups consisted of the bar participants where everyone could utilize the chat functionality in a large group. Customers could invite other customers to enter a primary group such as a smaller private group.

The app utilized a platform as a service (PaaS) to lower server costs and maintenance the PaaS was provided through a cloud service provider. Bhardwaj, Jain, & Jain, (2010) wrote in the International Journal of Engineering and Information Technology (IJEIT) that PaaS provides a common set of programming functions or databases to act as a foundation for the development of the app (pp. 61). This included a database, middleware and development tools (pp. 62). The app was written in java and used the approach of an authoritative group. Bevilacqua, (2013) describes an authoritative group as containing a central entity that has all the clients connected to it. When information is sent it is not directly sent to the other clients rather it is sent to the central server where it is then distributed to the connected clients, Bevilacqua compares this approach to watching tv (Bevilacqua, 2013). This approach allowed for less manipulation of the chat data and a more real time chat with less latency.

The Bar Fly app was designed and developed for Johnny’s on the android mobile platform using Android Studio. Android Studio is the official integrated development environment for android consisting of many developer tools and code editor (Meet Android Studio, 2018). For full functionality the cloud hosted server had to contain a database and a server-side application. The server-side program handled the creation of chat groups. The server also hosted a website where bar managers could manage the group chat, and promotions could be pushed to the app as a notification. Johnny’s used the app to increase revenue and repeat customers.

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# Project Rationale

Johnny’s Bar and Fine Dining needed to increase revenue that they feel may be lost due to long lines. Johnny’s decided that the best solution would be to have an app developed. The app consisted of an ordering feature that allowed the customers to place orders and a feature that enabled the customer to participate in group chats. The project also allowed the managers to push promotional notifications to customers mobile phones.

The ordering feature increased revenue, it allowed customers to order on the app and notified the customer when the order finished. Customers ordered more often because they did not have to stand in a line which gave the customers more time socializing with other customers. The order feature also increased serve times because the bartenders were able to clearly see the order on the screen this also had helped prevent wrong orders from being made. Once the order was made it was placed for pickup and the next order was started the bartender did not lose time interacting with as many customers as usual.

The ability to display notifications in the app had created more customer traffic to Johnny’s. The manager was able to log into the website designed for Johnny’s through a web browser. The manager could then use the website to monitor the group chat or push notifications of any promotions that were currently being offered. Customers were able to see notifications even if they were not within the vicinity. Customers that can saw the ongoing promotions stated that they would be more likely to visit Johnny’s when they were in the area.

The chat feature was developed in hope that a more technical crowd would enter the bar based off social technology and be more likely to use such a feature. The feature allowed customers to join in a group chat or enter a private chat. The group chat consisted of everyone that was in the bars vicinity while the private chat allowed for the customers to enter a one on one conversation or just a private smaller group conversation.

The app was completed in the eleven days that were scheduled for development. If the app was not completed in time the project would have failed and Johnny’s would not have been able to increase drink orders and decrease order lines.

# Systems Analysis and Methodology

Analysis of the original environment showed that Johnny’s owned several bars and a few fine dining restaurants. Johnny’s and its competitors did not have a mobile application resembling the developed app. The development of the app was new untested ground others in the same industry had utilized social media through third party platforms such as Facebook, Twitter, and others. Other companies at the time did provide for online or in app ordering, but these were meant for food to go orders not stay in orders of alcohol.

The project had a fast paced timeline and a smaller team of developers because of this Agile Scrum management was used. Scrum consists of multiple phases called sprints to complete tasks. Each sprint finished a different portion of the project at the completion of a sprint a review of work was completed.

A person that spoke on behalf of the company was chosen product owner. The product owner decided the requirements of the app and placed them in order from highest to lowest priority. The project required the following order: A cloud based server, a server side application, a database, the app, and a website. These items became the project backlog from which sprints were created.

The first sprint was to develop the server side application. The server side application needed to be completed first because handled the chat feature of the app. The server side application was completed successfully and placed on the cloud based server provided through a third party vendor.

The next sprint was development of the database. The database was used to maintain data about the bars location and items that could be ordered at that location. The app accessed the database to show what promotions and items were available at the current location. The database was developed successfully which allowed the ordering feature to discover what was being sold and which bar the customer was in.

The app sprint began with breaking down the sprint into smaller sections or sub sprints the first was graphical design and the other was the functional development of the app. The development sprint created the basic functionality of the app but also tied into the previous sprints by creating connections to the server side application and the database. The app needed to send and receive communications with the server side application.

The next sprint designed and created the management website. The website gave managers the ability to push notifications and monitor the group chat. The website needed to communicate with the database and have the ability to read chat communication within the server side application that was developed in a previous sprint. The website was completed on time and allowed the mangers to promote specials and monitor the group chat.

The final sprint tested all the systems. The testing discovered no bugs or non-functionality additional sprints were not needed to resolve any issues. The project completed and was delivered to the client.

# Goals and Objectives

The main goal of the project was to develop a mobile application for Johnny’s. The app needed secure two-way communication with a server provided through a third party. This requirement was to establish a chat interface and implement an ordering function within the app.

Goal 1: Develop a server side application that could handle secure two way communications.

* Objective 1: Understand server environment. This objective assessed the current server environment including what tools were available, what protocols were used in communication, the server operating system, and any administrator features available. This objective was successfully met when a third party server provider was decided on.
* Objective 2: Develop the server side application. This objective dealt with the design and development of a secure application that ran on the server. The objective dealt with the programming language used and how the connection was secured. The objective was met when testing showed no errors and the application was running on the cloud based server.

Goal 2: Develop a database that stored the bars locations, items for sale, and other information.

* Objective 1: This objective decided what information needed to be stored and how it should be stored. The objective was met when a database schema was completed.
* Objective 2: Decide on how the database was accessed. This objective decided what language was used for the database and how it would be accessed such through a browser, mobile interface, or some other way. The objective was met when it was decided that MySQL would be used, and the database would be accessed through both a mobile interface and a browser.
* Objective 3: Develop the database. This objective built the database using the specified language. The objective was met when the database showed no errors and was running on the server.

Goal 3: Develop the mobile application.

* Objective 1: Examine the current integrated development environment. This objective decided which integrated development environment (IDE) the app was to be developed with. The objective was met when the Android Studio IDE was decided to be used for development.
* Objective 2: Design the graphical interface. The look and flow were designed in this objective. This also included what was an interactable feature and where it would go. This objective was completed when a storyboard and all assets were chosen.
* Objective 3: Develop the ordering feature. This objective focused on how to communicate with the database that resides on the server. The feature needed to know the bars location compared to the user’s location and what items were available for ordering at the location. The objective was completed when tests showed successful connection to the database and the ability to display items.
* Objective 4: Develop the chat feature. This objective examined what was the best way to communicate with the server. This objective was completed when the app was able to communicate with the server side application.

Goal 4: Develop a management website for bar managers to log into and monitor the group chat or push promotion notifications to the mobile app.

* Objective 1: Evaluate needed features. This objective assessed the needs of managers and what features were needed on the website for managers to manage chat and push notifications. The objective was completed when a list of needs and requirement was created for the website.
* Objective 2: Design the website. This objective designed how the website would look and interact with the user. The objective was completed when the all assets were obtained, and a storyboard existed.
* Objective 3: Develop the website. This objective tied together the design with the functionality of the website resulting in a finished website. This objective was met when the site displayed no errors and was loaded onto the server.

# Project Plan and Timeline

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Deliverable or Milestone** | **Planned Duration** | **Actual Duration** | **Actual Start Date** | **Actual End Date** |
| Define server requirements | 1 day | 1 day | 3-4-18 | 3-5-18 |
| Assess server environment | 1 day | 1 day | 3-5-18 | 3-6-18 |
| Define security requirements | 1 day | 1 day | 3-6-18 | 3-7-18 |
| Develop server application | 2 days | 2 days | 3-7-18 | 3-9-18 |
| Milestone 1: The application is running on the server. |  |  |  |  |
| Define the required information for the database | 1 day | 1 day | 3-12-18 | 3-13-18 |
| Develop the database schema | 1 day | 1 day | 3-13-18 | 3-14-18 |
| Decide database language | 3 hours | 3 hours | 3-14-18 | 3-14-18 |
| Define how the database is accessed | 1 day | 1 day | 3-14-18 | 3-15-18 |
| Code the database in MySQL | 2 days | 2 days | 3-15-18 | 3-17-18 |
| Upload database to cloud server | 1 day | 1 day | 3-17-18 | 3-17-18 |
| Milestone 2: The database is running on the server |  |  |  |  |
| Define the IDE for application development | 3 hours | 3 hours | 3-19-18 | 3-19-18 |
| Create the design of the app | 1 day | 1 day | 3-19-18 | 3-20-18 |
| Define the flow of the app | 1 day | 1 day | 3-20-18 | 3-21-18 |
| Code the part of the app that will discover the user’s location | 2 days | 2 days | 3-21-18 | 3-23-18 |
| Code the connection to the database | 5 hours | 5 hours | 3-23-18 | 3-23-18 |
| Code the ordering part of the app | 3 hours | 3 hours | 3-24-18 | 3-24-18 |
| Milestone 3: The app can successfully connect to the database and order items |  |  |  |  |
| Code the chat feature that will connect and communicate with the server | 1 day | 1 day | 3-27-18 | 3-28-18 |
| Code the part that deals with a group chat and switching to a private chat | 2 days | 2 days | 3-28-18 | 3-30-18 |
| Milestone 4: The chat feature can hold a group and private chat successfully. |  |  |  |  |
| Document bar managers requirements for management site. | 1 day | 1 day | 3-30-18 | 4-1-18 |
| Create a story board that will show how the website will function | 1 day | 1 day | 4-1-18 | 4-2-18 |
| Code the website in HTML 5 and utilize cascading style sheets | 2 days | 2 days | 4-5-18 | 4-7-18 |
| Milestone 5: Managers can log into the website and manage the chat and notifications. |  |  |  |  |
| Testing of systems and repeat sprints if needed | 10 days | 10 days | 4-7-18 | 4-17-18 |
| Product release | 1 day | 1 day | 4-22-18 | 4-22-18 |

The project did complete on time meeting every milestone. The project had utilized the Agile Scrum methodology which gave way for many fast sprints. The method also allowed for rapid development of all aspects of the project. The original planned duration times were found to have matched the actual duration times.

# Project Development

The project successfully developed an app that provided chat and ordering functionality to the customers of Johnny’s. The project did complete with the estimated timeline experiencing few issues and deployed on time. The Agile Scrum methodology that was used for this project provided the developers plenty of wiggle room when completing a sprint. Developers often found themselves with a few extra hours at the end of a sprint. They used this time to test the sprint or refactor any code that needed it. This helped immensely at the end of the project when the final sprint involving whole system testing took place. The project involved a shorter timeline than usual, because of this Silent Studios decided to utilize only senior staff in order to accomplish the most efficiency in development.

# Problems Encountered

The project did not encounter any problems mainly due to the utilization of the Agile Scrum methodology. When the timeline was developed it was decided that the team would not try to schedule anything for less than at least one day this allowed for if a small task was finished early the developers knew that they had the rest of the day and could review code or implement testing.

# Unanticipated Requirements

The project was able to meet all requirements on time. There were only two unanticipated requirements. The first was in the completion of the website development sprint. When the website completed the product owner announced that a login needed to be implemented. The login was implemented in the same day with the website sprint and the project did not suffer for the change. The second unanticipated requirement was that a script needed to be created to act as a redirect. The script was needed so the app could go to the script and be redirected to the database. The need for the script was finished with an additional sprint in the database phase it added an additional two hours to the project and was completed successfully.

# Reasons for Change

The original proposal did not state the need for a manager login to enter the website. This was because the original proposal called for the website to be accessed through the local intranet not residing on a cloud based server and accessed through the Internet via a web browser. The decision to add a login was based off the fact that the website was no longer available to local secure traffic, but rather unsecured global traffic. The script was added because developers did not take it into consideration during the requirements phase. The process could have been accomplished without the script but that would have been not secure and would have left opportunity for server attacks such as denial of service (DoS) attacks.

# Actual and Potential Effects

The project impacted Johnny’s by providing a chat and order application for its customers. The effects of the project provided Johnny’s with increased order activity, and more satisfied customers. The apps current state has decreased the lines at Johnny’s and in what seems to be a by product the bartender retention rate has also increased. With the successful implementation of the app Johnny’s has hired Silent Studios to create an IOS version for apple phones and roll out an update for both apps mainly involving a better user interface.

The potential effects of the project for the future involve increased revenue to Johnny’s leading to possibly expanding the franchise. Johnny’s also hopes to possibly patent and sell this technology to other bar owners creating a unified experience for all bar goers. Silent Studios will provide any new updates that are needed upon agreement of a new contract.

# Conclusion

The project completed successfully and on time meeting the scheduled deployment date. Johnny’s provided a weekly sales diagram (see Appendix A) that showed the increase in of drink sales since the deployment of the app. The chart clearly shows an uptick in sales shortly after deployment. The development of the server side application was greatly increased due to the use of Hostgator (see Appendix B) as a third party server. It was decided that the business cloud package was used this service provided the space and tools for all web aspects of the project. The use of a cloud server allowed the developers to focus on the server app and not on the hardware specifications of the server. Johnny’s did also cut costs by not paying for their own servers and maintenance with this service.

The required database (see Appendix C) was built and placed on the server rather quickly as that it only required to store a few data items. The developers did run into an unforeseen issue with accessing the database. A script also had to be written that acted as a redirect for the app to access the database.

The developers utilized Android Studio for the app development. All aspects of this phase were on time and went smoothly. The manager website phase also went smooth except for the unforeseen requirement of a login screen. The login screen was created with an extra sprint added onto the phase.

The completed project help aid in Johnny’s goal of minimalizing the revenue loss that the bars where experiencing from customers not ordering due to long lines. Johnny’s also saw an increase in return customers since the project completion. The completed project delivered all of Johnny’s requirements and any future updates have been contracted out to Silent Studios.

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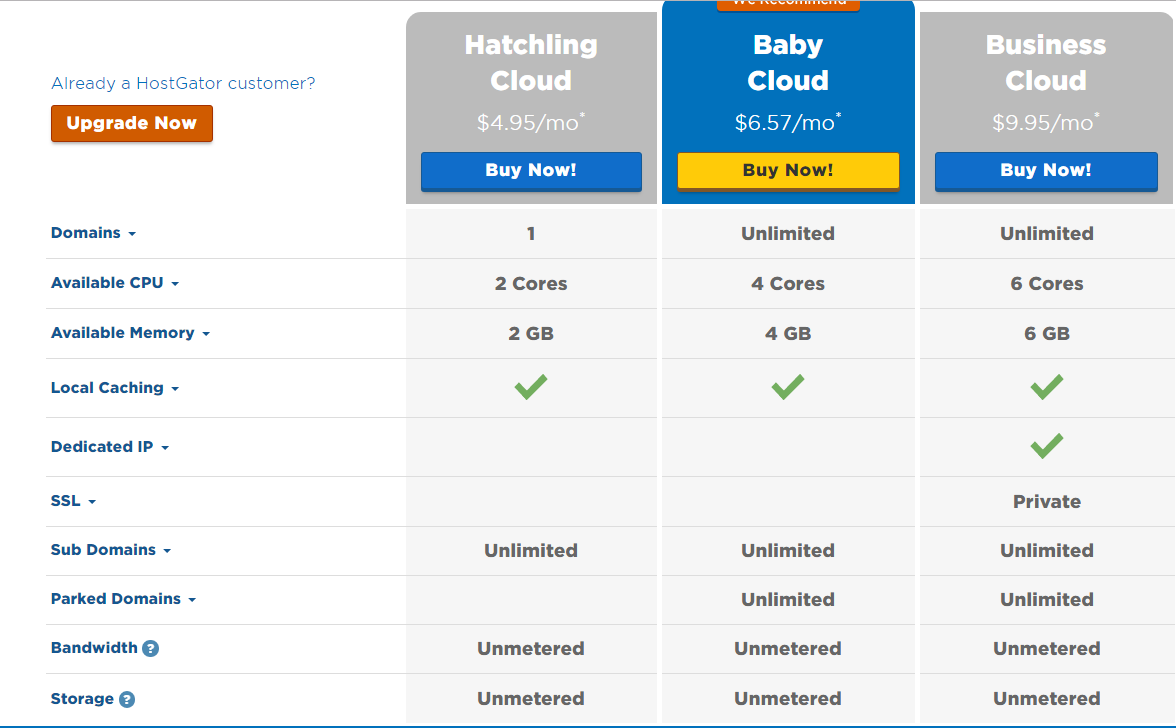
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# Appendix A

# Appendix B



(HostGator, 2018)

# Appendix C

