**D284 Project**

|  |
| --- |
| United Computer Consulting |
| CRM System Proposal for MJ Logistics Gaming Company |
| United CRM |

|  |
| --- |
| Noah Akers  10-19-2024  Version 1.0 |

Contents

[A. Introduction 3](#_Toc180234030)

[A1. Introduction and Purpose Statement 3](#_Toc180234031)

[A2. Overview of the Problems 3](#_Toc180234032)

[A3. Goals and Objectives 4](#_Toc180234033)

[A4. Prerequisites 4](#_Toc180234034)

[A5. Scope 5](#_Toc180234035)

[A6. Environment 5](#_Toc180234036)

[B. Requirements 8](#_Toc180234037)

[Business Requirements 8](#_Toc180234038)

[User Requirements 8](#_Toc180234039)

[Functional Requirements 8](#_Toc180234040)

[Non-Functional Requirements 9](#_Toc180234041)

[C. Software Development Methodology 9](#_Toc180234042)

[C1. Advantages and Disadvantages 9](#_Toc180234043)

[Advantages of the Agile Method 9](#_Toc180234044)

[Disadvantages of the Agile Method 9](#_Toc180234045)

[Advantages of the Waterfall Method 10](#_Toc180234046)

[Disadvantages of the Waterfall Method 11](#_Toc180234047)

[C2. Best suited 11](#_Toc180234048)

[D. Create Two Representations of the Software Solution 12](#_Toc180234049)

[GUI Representation 12](#_Toc180234050)

[Ticketing system representation 13](#_Toc180234051)

[E. Testing 15](#_Toc180234052)

[Save Filter Templates 15](#_Toc180234053)

[Control User Permissions 16](#_Toc180234054)

[OS and Browser Support 17](#_Toc180234055)

[F. Sources 19](#_Toc180234056)

# Introduction

# A1. Introduction and Purpose Statement

United Computer Consulting (UCC) is proposing a new customer relationship management (CRM) system that will meet the growing needs of MJ Logistics Gaming Company (MJLGC). We call this new CRM system *United CRM*. The proposed CRM makes use of the MySQL database management system*.* We propose a cloud hosting model for our CRM system. The proposed solution falls in the Software as a Service (SaaS) category in that we will maintain all of the system's infrastructure and provide an application for users. The only thing MJLGC employees will have to worry about is accessing the website to use our web app or download our desktop app.The details of our proposal are explored in sections A through E of this proposal document.

Our proposed CRM system aims to provide a solution that meets the many important needs of MJLGC. The proposed system must be user-friendly to streamline the data retrieval process and enhance MJLGC employees’ time usage. The proposed system must be secure and integrate well with other systems used by MJLGC to improve data sharing. The proposed CRM system must also support many concurrent users and be able to scale to more users and greater amounts of data. Overall, the proposed CRM system will meet the core needs of MJLGC and allow you to upgrade from the outdated and underequipped system you currently use.

# A2. Overview of the Problems

The current CRM used by MJ Logistics Gaming Company has been overrun by extreme growth within the past two years. MJLGC has seen an increase in sales of 42%, overtaxing the currently used system. The limitations of their current CRM system have hindered their ability to properly track sales, manage reporting, manage client contact information, etc. The current system that they use makes use of a disconnected set of tools in spreadsheet and database management software and requires many processes to be manually carried out by employees. This is inefficient and requires many unnecessary steps that can be avoided with a properly constructed CRM.

The proposed CRM will address these issues by using the open-source MySQL database management system on the backend to handle all data storage. The open-source nature of MySQL will reduce the overall cost of the proposed CRM system because MySQL is free (Erickson, 2024). It will also allow our CRM system to be flexible because we have access to the MySQL source code. MySQL is known for its ability to handle large amounts of data, and it will be able to maintain all of the information that MJLGC needs to store. The current system will remove the need for repeated manual processes whenever possible. For instance, users will be able to save previously generated reports and previously used search filters. This will help to increase the efficiency of querying the database for frequently needed data. The proposed CRM will also provide a connected system for all company information. Due to the strengths of MySQL, we will not have to use different spreadsheet and database software, it can all be handled with a MySQL backend. These are simply a few of the advantages that the proposed CRM system will offer; further details are discussed throughout this proposal.

# A3. Goals and Objectives

These are the goals of the CRM:

The CRM must be scalable

The CRM must be efficient

The CRM must be secure

The CRM must integrate with the current system

The CRM must be user-friendly

These are the objectives of the CRM:

The CRM must be scalable to support many users, at least 500 concurrent and 2000 total users. The CRM must also be able to handle an ever-increasing amount of data to be stored.

The CRM must be efficient in that it consolidates data into an easy-to-access, well-designed database. Related database tables should be connected through primary and foreign keys to allow for more efficient access to data from different tables.

The CRM must keep data secure and only allow users to access necessary data using user account permissions. All data must be stored within the USA at all times.

The CRM must integrate with the current system at MJLGC where possible and improve on it when needed. This includes integrating our MySQL server with the active directory server at MJLGC. This will allow user accounts to be authenticated through the active directory server, further adding to security as well.

The proposed CRM must have an intuitive user interface with tools to streamline the data retrieval process. An interface that allows for easy scrolling through database tables, saving previously generated tables, and saving previous search parameters all contribute to user experience.

# A4. Prerequisites

|  |  |  |  |
| --- | --- | --- | --- |
| Number | Prerequisite | Description | Completion Date |
| 1 | Set up the hosting server | Set up the server to host the CRM system. This server will be within the UCC data center. It will both host the website used to access the CRM, as well as store the database. Ensure integration with the current active directory server. | October 22nd,  2024 |
| 2 | Create testing environment | Construct a test version of the environment where changes to the proposed system can be implemented before they are deployed to MJLGC. This test environment will be housed at the UCC data center. | October 25th,  2024 |
| 3 | Obtain Data | Obtain data from MJLGC which is to be stored in the CRM database to ensure our system can support the current data. | October 25th, 2024 |
| 4 | Determine necessary training | Meet with MJLGC management to determine what training the MJLGC employees will need. The training requirements will depend on whether MJLGC would like to support the system themselves or outsource this need to UCC. | October 30th,  2024 |

# A5. Scope

The scope of the proposed CRM system includes:

* Reporting capabilities
* Ability to support 500 concurrent users and at least 2000 total users
* Ticketing system
* Hosting of the system

Elements that are out of the scope of the proposed CRM system include:

* Forecasting is currently out of the scope of the proposed solution
* Networking decisions, such as your internet service provider (ISP), are out of the scope of our proposed solution and should be handled by your network administrator.
* Quoting capabilities are also currently out of scope

# A6. Environment

Operating Systems:

* IOS
* Android
* Microsoft Windows
* Application support systems for mobile and tablet devices

Browsers:

* Chrome and Chromium
* Firefox
* Microsoft Edge
* Safari

Back End (Database):

* MySQL version 8.0
* Hosting server in the UCC data center

This server will be integrated with the current active directory server already in use at MJLGC.

* Service Level Agreements (SLAs): If you choose to use our proposed CRM system, we will work closely with the MJLGC management to create comprehensive SLAs. These SLAs will build upon the current proposal to lay out what is expected of our system. This will allow the developers at UCC, and management at MJLGC, to have a clear understanding of the final goal. Below are some aspects that may be included in our SLAs.
* Support: Our support team is available 24/7 and has extensive knowledge of any system we provide. Therefore, they can assist with any issues that users encounter with the proposed CRM system. We also offer training to your current support staff so that they can provide in-house support if that is preferred.
* Connectivity outages: Most connectivity outages should be handled primarily by your ISP. However, if the issue persists, our support team will be available to troubleshoot these issues 24/7. We strive to maintain the “five nines” of 99.999% uptime; if we are unable to meet these standards, we offer service discounts based on the duration of the outage. We also ensure frequent database backups to maintain the integrity of your data.
* Custom Development: This is a key strength of our development model. By employing the Agile method, we can quickly implement feedback into custom-designed features at our client’s request.
* Upgrades: We will provide periodic security upgrades. Our team will work with you to determine a time when these upgrades can be implemented without impacting your use of the system. We will also offer optional upgrades that implement new, cutting-edge technologies that we may think would benefit the system in the future.
* Refuse Upgrades: The client can refuse any non-essential upgrades. Security upgrades are the only upgrades that are mandatory.
* Maintenance: Due to our agile development techniques, we offer maintenance throughout the development process by adding new features over time based on the feedback of users. We also provide continual updates to ensure that the system is up to date with current versions of operating systems and browsers. We will also fix any bugs that users encounter that are out of the scope of normal support tasks.
* Testing before deployment: We will build a custom environment in our data center that mimics the environment in which the CRM system will operate. This environment can be used as a sandbox to test the proposed CRM before initial deployment and before deployment of upgrades. This will ensure that our tests will not impact your data.

# Requirements

The distinct requirements that we will cover are:

* Reporting (Business Requirement)
* Number of Users (User Requirement)
* Ticketing System (Functional Requirement)
* Hosting (Non-Functional Requirement)

## Business Requirements

**Reporting:**

The ability to generate informative reports based on data held in the CRM is of the utmost importance. The proposed CRM will offer users the ability to save the filters that they previously used to retrieve certain information. This allows users to create custom templates that can be reused for future reports. This will streamline the retrieval of information that is needed on a regular basis. This will be done by creating a view table of the saved template and then returning that view whenever the saved template is used in the future. This view table must be updatable so that it will reflect changes in the actual database. The graphical user interface that we provide will allow users to navigate through data displayed in an intuitive fashion. Users will only have access to the data that they require for their job. This will be accomplished by using the principle of least privilege to only give employees access to the data they need. Each user account will be able to save reports that they have previously generated so that they can easily reference them in the future.

## User Requirements

**Number of users:**

The CRM needs to support at least 2000 total users and 500 concurrent users to meet the requirements specified by MJ Logistics Gaming Company. This is accomplished using MySQL which supports multiple users all with different usernames and passwords. The system administrator can simply create user accounts for each employee, and they can access the CRM data from their personal accounts. We will also ensure that the

## Functional Requirements

**Ticketing system:**

A ticketing system will be provided to keep track of the interactions with contacts. A database table will hold the necessary information such as the identity of the contact, their reason for calling, date information, and follow-up details. Each of these interactions will be kept unique using an auto-incrementing ID number as the primary key that will be assigned to each entry in the table. An audit trail will be maintained using a separate table, connected to the main table using the ID number as a foreign key. This table will hold information about the steps that take place during the processing of a ticket.

## Non-Functional Requirements

**Hosting:**

The proposed CRM will use off-site hosting at the UCC data center. This will allow us to maintain the hosting of the website and database all at the same place. We choose to host our services on our own data centers so that we can ensure the best quality for our clients. We do not want to outsource hosting to some big cloud computing corporation that doesn’t understand our client’s needs. This solution also ensures that all data is always housed within the USA. We understand that external hosting can scare some customers. Therefore, please refer to section A6. ENVIRONMENT above for more information on concerns such as connectivity outages, service level agreements, upgrades, custom development, ability to refuse upgrades, support, and maintenance.

# Software Development Methodology

There are many different software development methodologies. The Agile method provides adaptability and speed. The waterfall method provides structure and precision. The advantages and disadvantages of each method are discussed below.

# C1. Advantages and Disadvantages

## Advantages of the Agile Method

The agile method allows for time-efficient development which means you can deploy software more quickly (Olic, 2024). This will be particularly beneficial to the current project because MJ Logistics Gaming Company has already outgrown its current CRM system so the sooner we can provide our solution, the better.

Another strength is that you are able to get quick feedback from users and improve the user experience as you go (Olic, 2024). This will allow us to adapt to the changing needs of MJ Logistics Gaming Company. This will be especially beneficial due to the fact that MJLGC has expressed a desire for support and maintenance.

The agile method also fosters a focus on quality and prevention of long-lasting bugs (Olic, 2024). Because of the quick turnaround of each development cycle, we are able to detect issues and fix them before they become a headache for the client. This will be beneficial in the current project because we are an external consulting group and there are certainly other groups competing for the opportunity of this job. If we can maintain a good level of quality, MJLGC is likely to stick with our solution and not seek alternatives.

## Disadvantages of the Agile Method

The agile method requires more energy and oversight from both developers and customers because they must interact with each other regularly to ensure effective development (Olic, 2024). While this communication can lead to a good product, it takes more effort and may not be desirable for the involved parties. This might hinder the current project depending on the wishes of MJLGC. If they do not want to be deeply involved in every step of development, it may be difficult to get the necessary feedback to deliver a good product. It could also add to the development time in some cases if feedback takes too long. Although agile development usually offers a time-efficient method, this is a case in which the time of development could be negatively impacted.

The short development cycles do not allow much time for brainstorming; therefore, the designers may have to continually implement new ideas over and over again until they meet the needs of the client (Olic, 2024). This can be especially inefficient if the designers have to start from scratch every time. This could hinder this project by increasing the time of development and causing frustration for users if their needs are not met quickly enough.

Due to the uncertain nature of the development cycle, it can be difficult to give definitive estimates on the expected cost or schedule of the software (Olic, 2024). Because we will not know the full scope of the project until we begin work, we will not be able to provide a specific price or release schedule to MJLGC. This would make contract negotiations difficult because MJLGC will not know for certain what they will have to pay. Under or overestimating could cause significant difficulties in communication between UCC and MJLGC.

## Advantages of the Waterfall method

The waterfall method offers a structured, well-defined plan for development (Lucidchart, 2018). This allows developers and customers to have a clear idea of the development process. This would benefit the current project by making it easy to give accurate estimations on a timeline and expected costs. This would make the decision easier for MJLGC.

The waterfall method also allows for a clear end goal to be established early in the development process (Lucidchart, 2018). This is especially useful when the requirements are clearly laid out in advance. In the current project, MJLGC has provided many detailed requirements that would allow us to create a solid end goal early in the development process.

The waterfall method encourages thorough documentation and strong communication between team members (Lucidchart, 2018). This allows for different teams to tackle different portions of the project and still understand what was done by other teams. It can also help bring a new member of the project team up to speed quickly. Strong communication is always valuable; therefore, this is certainly an advantage to the current project. It would help with United Consulting Company’s development and make our life easier. We could separate out tasks and still have the assurance that everyone will be on the same page. Some of our documentation could even be used to provide periodic updates to MJLGC.

## Disadvantages of the Waterfall method

Testing is reserved for late in the development process (Lucidchart, 2018). This can lead to unnoticed bugs being discovered close to the desired deployment date, which could alter the expected timeline. This would negatively impact the current project because MJLGC is already in a time crunch due to outgrowing its current CRM system. If we were to make them wait even longer than planned, it would certainly hurt their business.

The waterfall method makes it difficult to implement changes during the development process (Lucidchart, 2018). This is because of the strict planning that is a cornerstone of the waterfall method. This would make it difficult for us to adapt to changes that MJLGC may request in the future. Because the needs of MJLGC have been growing rapidly in the recent past, there may be unforeseen changes that must be incorporated during development.

The waterfall method also tends to lack proper communication with the client (Lucidchart, 2018). This could be a hindrance to the current project because MJLGC seems to have a good understanding of what they want and by not collecting feedback from them, we could hurt our ability to provide the best product to them.

# C2. Best suited

The Agile method is best suited for the proposed solution. Something that is interesting is that many of the strengths of each method can also be weaknesses depending on the circumstances. There is a risk versus reward factor that plays into the Agile method. Weighing these risks and rewards for this particular project, it appears that the agile method is still the most effective. This is largely because, while the MJLGC has already provided information on what they require from our software solution, they have left much of the implementation up to us. By using the Agile methodology, we will be able to provide our solution in small chunks that MJLGC can evaluate. If they are not happy with part of our implementation, we can swiftly change it to something that they would prefer. We will be able to focus on the most important aspects that MFLGC requires, such as the ability to handle large amounts of data, and then add quality-of-life features as we continue to meet more of the requirements. This will allow us to quickly meet the basic needs of MJLGC, and then back this up with a more refined product as we go. If we were to use the Waterfall method, our development would be more rigid, and we would not be able to adapt to customer feedback. Although we have a good deal of information at the start, which would allow us to create a more structured plan like the waterfall approach recommends, we would be left without the ability to adapt to user feedback. No matter how much we plan for this project, there will always be unforeseen circumstances that the waterfall approach will find difficult to overcome. The waterfall approach also tends to take longer to return a usable product. This means MJLGC would have to continue using its outdated system. This might cause them to choose another company’s proposal simply due to time constraints, even if our product is better in the long run. In conclusion, the agile method will offer the greatest benefit to both UCC and MJLGC and will allow us to provide a valuable product in a reasonable amount time.

# Create Two Representations of the Software Solution

## GUI Representation

The following picture represents what a portion of the graphical user interface might look like. There is a search bar to search for specific data. On the right, there are filters that allow the user to select certain fields to display; a few possible filters are shown as examples because displaying all of the possible filters would be far too complicated for this high-level representation. The user can save their selected filters so that they can look up the same fields quickly in the future. The hamburger menu in the top right corner will display options such as changing accounts and logging out. The main body of the GUI will display the data for which the user searched. The “Column Name” is simply a placeholder to show what the output might look like.

A screenshot of a computer

Description automatically generated

6

5

4

3

2

1

The below table explains the purpose of each component of the GUI.

|  |  |
| --- | --- |
| ID | Purpose |
| 1 | This is a simple textbox that allows users to search for specific data within the database |
| 2 | Users can use this hamburger menu to select from options such as “Log Out” and “Switch Account” |
| 3 | This box is where users can select specific column names to sort their reports by. This allows users to only return data from specific columns. |
| 4 | This button allows users to save the filters that they have used to be reused again at a later date. |
| 5 | This is a representation of the output that will be generated. The “Column Name” at the top of each column are just placeholders for the column names that would be there during actual use of the system. |
| 6 | These are basic window options such as close, minimize, and maximize, in that order from red to green. |

## Ticketing system representation

Below is a simple ERD that represents the ticketing system that the proposed CRM will implement. The Ticket table contains all necessary variables to track the information that the MJLGC desires. Whenever a new ticket is created, it is assigned a unique, auto-incrementing TicketID and the employee enters the information about the ticket. Whenever an action is performed relating to the ticket, the TicketTracking table is updated with the necessary information based on what was done to the ticket. This acts as an audit trail for the ticketing system because it keeps track of all actions performed during the lifecycle of a ticket. It allows management to trace any actions performed to the ticket and employee related to that action. The Employee table is not strictly related to the ticketing system, but it is needed to retrieve employee information if management wants to know the identity of an employee who performed an action on a ticket. The relationship cardinalities are shown using crow’s foot notation. Each relationship is one-one.

A diagram of a ticket tracking

Description automatically generated

# Testing

# Save Filter Templates

|  |
| --- |
| Requirement to be tested:  We are testing the ability of the software to save previously selected filters and return data based on those filters at a future date. If the data has been updated, it should be reflected in the output of the saved filters. |
| Preconditions: Conditions that must be present before the test case can successfully run.   * Must have the database constructed * Database must contain data, either sample data or real data * Must generate data that can be added to the database to test the ability to return accurate data after the database is updated |
| Steps: The steps the tester must execute to test the feature.   1. Select filters and output the data based on those filters 2. Save the filters as a template 3. Clear output 4. Execute the saved template 5. Check that output is accurate 6. Update the data in the database 7. Execute the saved template 8. Check that the data has been properly updated |
| Expected results: Expected results and any side effects such as updating a database, writing to a file, etc.  It is expected that the saved filter template will be able to return the same data every time until the database is updated. Once the database is updated, the saved template should return the updated data with no issues and without the user having to perform any changes to the saved filter template. |
| Pass/Fail: Explain why the test case passed or failed. The results can be compiled and used to determine if the application is ready for delivery or release.  Pass. The save filter functionality works and can be used with a table both before and after it is updated. |

# control user permissions

|  |
| --- |
| Requirement to be tested:  Test that the administrator account has control over the permissions of each user account and that the admin can alter those permissions. |
| Preconditions: Conditions that must be present before the test case can successfully run.   * Have access to the administrator account * Create user accounts to be used for testing |
| Steps: The steps the tester must execute to test the feature.   1. From the admin account, ensure that a user account has permission to both view and update the database 2. Check that the user account can perform the actions allowed by its permissions. 3. Remove the update permission 4. Check that the user account cannot update database data, but can still view the data 5. Remove the view permission 6. Check that the user account cannot view database data 7. Add both permissions back to the user account 8. Check that the user account can now update and view the database |
| Expected results: Expected results and any side effects such as updating a database, writing to a file, etc.  The user account should only be able to perform the actions that its permissions allow. If a permission is removed, the account should lose the abilities allowed by that permission. If a permission is granted to the account, it should gain the abilities allowed by that permission. No expected side effects. |
| Pass/Fail: Explain why the test case passed or failed. The results can be compiled and used to determine if the application is ready for delivery or release.  Pass. Using MySQL, we are able to create user accounts with different permissions. These permissions can be updated by the admin account. |

# OS and Browser support

|  |
| --- |
| Requirement to be tested:  Test that the system works with the necessary operating systems and browsers. |
| Preconditions: Conditions that must be present before the test case can successfully run.   * Have access to devices needed to test each OS and browser * Full system must be complete because this tests the overall functionality of the system, not just one component |
| Steps: The steps the tester must execute to test the feature.  NOTE: Checking that the system works on an OS or browser involves:   * Loading the webpage or desktop app * Logging in to a user account * Checking overall functionality of the system by accessing database tables, creating reports, etc.   Because this will have to be done multiple times due to the many operating systems and browsers to check, these steps will not be written out for each check. Please note that the above steps must be carried out for each OS and browser check in the steps below.   1. Check that the system works on the latest version of Chrome and Chromium 2. Check that the system works on the latest version of Firefox 3. Check that the system works on the latest version of Safari 4. Check that the system works on the latest version of Microsoft Edge 5. Check that the system works on mobile and tablet app support systems 6. Check that the system works on the latest version of IOS 7. Check that the system works on the latest version of Android 8. Check that the system works on the latest version of the Microsoft OS |
| Expected results: Expected results and any side effects such as updating a database, writing to a file, etc.  The expected results are that the system functions properly for each OS and browser tested. MJLGC made it clear that they needed this support; therefore, we were sure to provide it during our development. If information stored in the system is updated by using the system on one browser or OS, the changes should be reflected on all other versions. |
| Pass/Fail: Explain why the test case passed or failed. The results can be compiled and used to determine if the application is ready for delivery or release.  Pass. The system was designed to work with each of the operating systems and browsers mentioned. The system was also designed with the fact in mind that Safari does not support MySQL directly. However, with a properly designed web app we are able to circumvent this issue to allow access to the CRM system from Safari. |

# Sources

1. Erickson, J. (2024, August 29). *MySQL explained: Your guide to mastering this powerful database*. MySQL: Understanding What It Is and How It’s Used.

Retrieved October 18, 2024, from

<https://www.oracle.com/mysql/what-is-mysql/>

1. Olic, A. (2024, May 13). *Advantages and disadvantages of agile project management [checklist] · activecollab*. ActiveCollab.

Retrieved October 18, 2024, from

<https://activecollab.com/blog/project-management/agile-project-management-advantages-disadvantages>

1. Lucidchart. (2018, August 10). *The Pros and cons of waterfall methodology*.

Retrieved October 18, 2024, from

<https://www.lucidchart.com/blog/pros-and-cons-of-waterfall-methodology>