

American Video Game Company

CRM PROPOSAL

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Software Engineering - C188
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CONTENTS

A.	INTRODUCTION	3
A.1.	Purpose Statement	3
A.2.	Overview of the problem	3
A.3.	Goals and Objectives.....	3
A.4.	Prerequisites	3
A.5.	Scope.....	3
A.6.	Environment.....	4
B.	REQUIREMENTS	5
B.1.	Business Requirements	5
B.2.	User Requirements	5
B.3.	Functional Requirements	5
B.4.	NonFunctional Requirements	5
C.	SOFTWARE DEVELOPMENT METHODOLOGY.....	6
C.1.	Advantages of the waterfall method	6
C.2.	Disadvantages of the waterfall method	6
C.3.	Advantages of {a different method}	7
C.4.	Disadvantages of {a different method}	8
C.5.	best suited.....	8
D.	DESIGN	9
D.1.	Flowchart	9
D.2.	Proposed GUI mockup	10
E.	TESTING.....	11
E.1.	FUNCTIONALITY TESTING	11
E.1.1.	FUNCTIONAL TESTING - USER INTERFACE.....	11
E.1.2.	PERFORMANCE TESTING - SCALABILITY	12
E.1.3.	SECURITY TESTING - DATA ACCESS CONTROL.....	13



A. INTRODUCTION

The proposed system is a customer relationship management (CRM) system for the American Video Game Company. It aims to improve the management of various manual and automated processes within the company. The system should be able to integrate with other systems, maximize data sharing and reporting efficiency, and enhance business process flows. The system will help manage client contacts, sales tracking, activity management, and reporting. The company has experienced significant sales growth and is in need of a more efficient CRM system to support its expanding operations.

A.1. PURPOSE STATEMENT

The purpose of this document is to outline the requirements and objectives for implementing a Customer Relationship Management (CRM) system for the American Video Game Company. It provides an overview of the current system and identifies the need for a more efficient and integrated solution.

A.2. OVERVIEW OF THE PROBLEM

The proposed solution will solve the problem of American Video Game Company outgrowing its existing systems for managing all aspects of CRM. The company's current environment consists of disconnected custom-built tools, spreadsheets, and manual processes spread across multiple offices and remote team members. The new system aims to integrate these processes, improve efficiency in data sharing, reporting, and business process flows, and provide better management of client contacts, sales tracking, activity management, and reporting.

A.3. GOALS AND OBJECTIVES

The goals and objectives for the project and solution are as follows:

- *Provide a system that consolidates all contact and business information.*
- *Generate reports on the company's activities and interactions with contacts.*
- *Control access to features based on roles and permissions for both internal and remote users.*
- *Enable access to the system by third-party marketing companies under contract.*

A.4. PREREQUISITES

Aspects that need to be in place prior to the design, development, and implementation of the project.

Number	Prerequisite	Description	Completion Date
1	Hosting	Clear connectivity and hosting solution	12/8/2023
2	Integration	Integration Plan for Active Directory Server	12/8/2023
3	Security	Data Security and Privacy Compliance Framework	12/8/2023

A.5. SCOPE



Items that are in scope:

- *Consolidation of contact and business information*
- *Activity tracking and reporting*
- *Access control and permissions*
- *Integration with third-party marketing*
- *Scalability and future integration*

Items that are out of scope:

The proposed solution will not include detailed system requirements, use cases, design, and other deliverables. These will be part of the project undertaken with the awarded vendor after the proposal is accepted.

A.6. ENVIRONMENT

Hosting:

- *Amazon Web Services (AWS) will be the chosen hosting environment for the American Video Game Company's CRM system because it offers a globally connected and reliable infrastructure that ensures high connectivity and meets the specified Service Level Agreements. Through (AWS) the system can expect to have 24/7 technical support, a dedicated testing environment for pre-production testing, and high scalability potential that will allow the CRM solution to adapt to an evolving user base.*

Operating System (OS) and Browser Support:

- *The CRM system must be compatible with various operating systems and browsers, as specified in the general requirements. This includes support for the latest versions of Chrome, Firefox, Internet Explorer, Safari, and mobile/tablet platforms. Describe the IT and hardware environments that the solution will be deployed in.*



B. REQUIREMENTS

- *Proposals for Cloud Deployment and Subscription Models.*
- *Scalability and Compatibility.*
- *Soft delete and maintain historical records.*
- *Hard delete for specific roles/permissions.*
- *Testing Environment and Data Security*

B.1. BUSINESS REQUIREMENTS

Embracing Amazon Web Services (AWS) for cloud deployment offers a resilient and scalable solution. AWS provides versatile subscription models, such as Pay-as-You-Go and Reserved Instances, allowing the CRM system to adapt to changing user demands efficiently. Leveraging AWS's global infrastructure ensures high availability and low-latency access for users across the globe.

B.2. USER REQUIREMENTS

Employing AWS's Elastic Container Service (ECS) with Docker containers facilitates scalability by enabling the deployment of microservices. This will ensure that each component can scale independently to handle varying workloads. AWS's compatibility across different operating systems and browsers ensures seamless integration and user accessibility. This will guarantee support for 2,000 users and scalability for high peak times.

B.3. FUNCTIONAL REQUIREMENTS

To implement the "soft delete" we would add an "IsDeleted" column to relevant tables in the database. When a record is marked for deletion, the column is set to true, excluding the data from regular queries. Recovery will be possible by updating the "IsDeleted" value to false. For Historical records we will create a repository to archive information without deletion and ensure that it's recorded with a timestamp.

"Hard delete" will require us to implement role-based access control, where the admin will have full permissions, including the ability to permanently delete records. Through SQL GRANT and REVOKE statements, these permissions are allocated or revoked based on the designated user roles. This ensures that only users with the 'Admin' role possess the necessary authorization to execute the "hard delete" operation in the CRM system.

B.4. NONFUNCTIONAL REQUIREMENTS

To meet the non-functional requirement of creating a testing environment aligned with production standards, we will replicate the production setup, implement data privacy measures such as anonymization using DataVeil or ARX, enforce user permission controls, apply robust security protocols, and conduct regular audits. This approach ensures a secure testing environment compliant with data privacy regulations and mirrors the production system effectively.



C. SOFTWARE DEVELOPMENT METHODOLOGY

The Waterfall methodology is a linear and sequential approach to software development. It follows a structured progression through phases, where each phase must be completed before moving on to the next. The typical phases of the Waterfall model include requirements, design, implementation, testing, deployment, and maintenance. Once a phase is completed, it is considered locked, and changes are difficult to implement. This model is often represented as a cascade, with progress flowing downward.

The choice between Waterfall and Agile depends on the project's nature, requirements clarity, and the organization's culture. While Waterfall provides a structured approach suitable for well-defined projects with stable requirements, Agile offers flexibility and adaptability, making it well-suited for projects with evolving requirements and a need for frequent customer collaboration. Each methodology has its strengths and weaknesses, and the selection should align with the specific needs and goals of the project and organization.

C.1. ADVANTAGES OF THE WATERFALL METHOD

Structured Approach:

- *Benefit: Provides a clear and sequential framework for project planning and execution.*

Detailed Documentation:

- *Benefit: Produces comprehensive documentation, aiding future reference and maintenance.*

Predictable Timelines:

- *Benefit: Facilitates detailed planning, resulting in more predictable timelines and costs.*

Stable Requirements:

- *Benefit: Rigorous upfront requirements gathering leads to stable and well-understood project requirements.*

Limited Customer Involvement:

- *Benefit: Suitable for projects with minimal customer involvement post the initial requirements phase.*

C.2. DISADVANTAGES OF THE WATERFALL METHOD

Limited Flexibility:

- *Challenge: Adapting to changes becomes difficult once a phase is completed.*

Late Customer Feedback:

- *Challenge: Limited customer involvement may lead to delayed feedback, affecting user alignment.*

Risk Management:



- *Challenge: Risks are addressed late, potentially causing unexpected issues during testing.*

Long Delivery Time:

- *Challenge: Sequential phases may extend the overall delivery time, especially if changes are needed.*

Adaptability to Changes:

- *Challenge: The model may struggle to accommodate evolving requirements common in dynamic projects.*

C.3. ADVANTAGES OF {A DIFFERENT METHOD}

(We are going to use the Agile methodology for comparison).

Flexibility:

- *Benefit: Agile adapts quickly to changing business needs, fostering flexibility in the CRM project.*
- *Benefit to project: Agile accommodates evolving requirements, allowing the CRM system to respond to dynamic market conditions.*

Continuous Feedback:

- *Benefit: Regular customer involvement ensures ongoing alignment with user expectations throughout development.*
- *Benefit to project: Ongoing customer involvement ensures the CRM system aligns closely with user needs.*

Iterative Development:

- *Benefit: Incremental updates enable the company to benefit from CRM features earlier in the development process.*
- *Benefit to project: Incremental delivery means the company can start benefiting from CRM capabilities earlier.*

Early Issue Detection:

- *Benefit: Integrated testing facilitates early issue detection, reducing the risk of late-stage problems.*
- *Benefit to project: Integrated testing reduces the risk of late-stage challenges during CRM deployment.*

Quick Time-to-Market:

- *Benefit: Agile's iterative approach often results in a faster time-to-market for CRM deliverables.*
- *Benefit to project: Agile's iterative approach supports the company in adapting quickly to changing industry requirements.*



C.4. DISADVANTAGES OF {A DIFFERENT METHOD}

(We are going to use the Agile methodology for comparison).

Scope Management:

- *Challenge: Agile's flexibility may lead to scope creep, impacting project timelines and budgets.*

Customer Availability:

- *Challenge: Dependence on regular customer involvement may hinder progress if key stakeholders are unavailable.*

Learning Curve:

- *Challenge: Teams new to Agile may face a learning curve, affecting initial project efficiency.*

Resource Intensity:

- *Challenge: Agile's collaboration may be resource-intensive, especially in large-scale CRM projects.*

Documentation Challenges:

- *Challenge: Agile's focus on working software over documentation may impact project record-keeping.*

C.5. BEST SUITED

The Waterfall methodology is well-suited for the CRM project due to its alignment with the project's characteristics. With clearly defined and stable requirements, Waterfall's structured approach ensures thorough documentation, predictable timelines, and systematic testing—essential for the complexity of a CRM system. The model's resistance to changes post the requirements phase complements the project's need for a stable scope, reducing the risk of scope creep. Additionally, the sequential progression aligns with the systematic deployment requirements of the CRM system, while the model's risk management approach addresses potential issues proactively at each phase. Overall, the Waterfall methodology is a fitting choice for the successful development and deployment of the CRM system for the American Video Game Company.

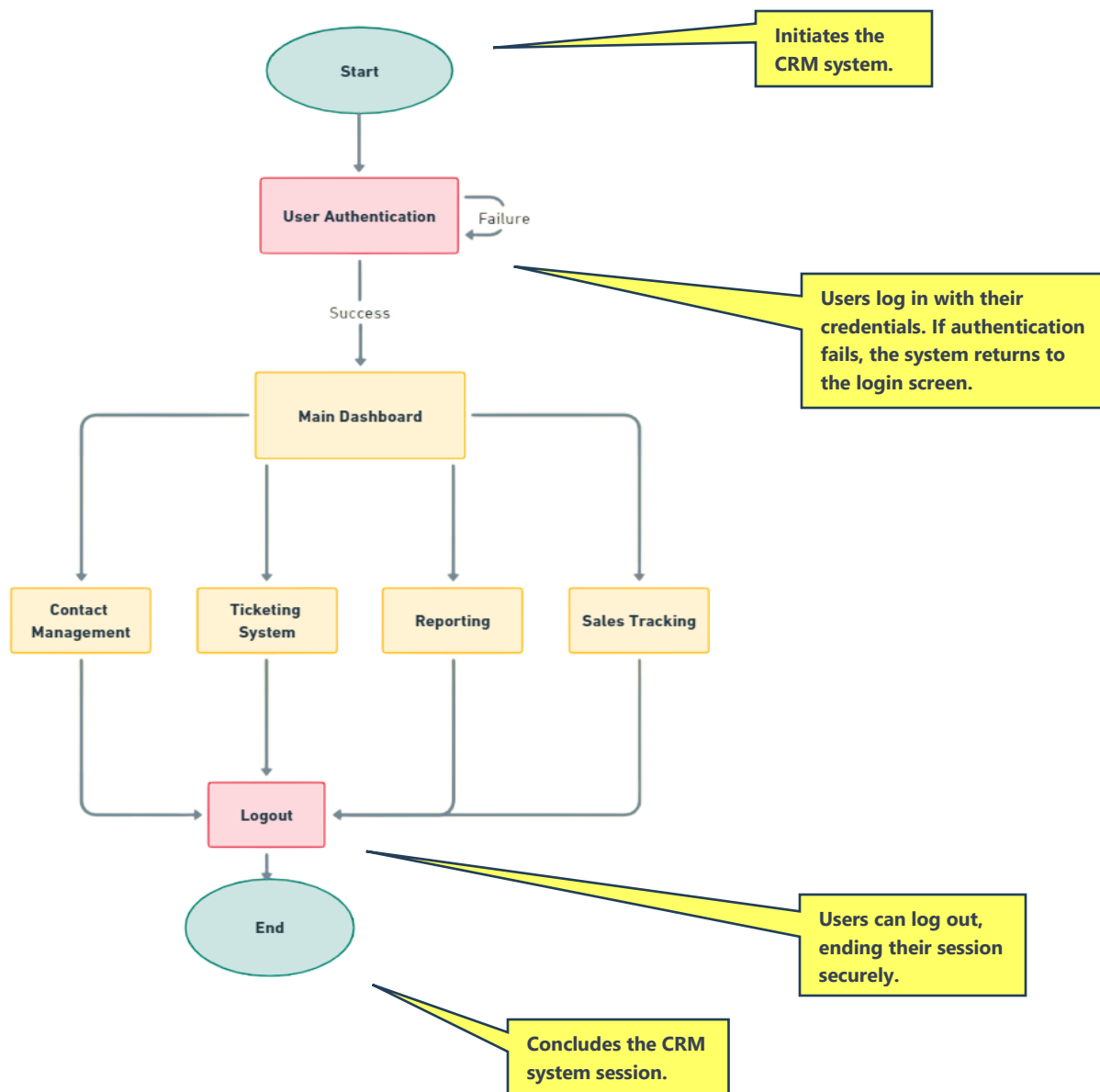


D. DESIGN

The CRM design caters to the American Video Game Company's sales force with robust contact management, communication tracking, and advanced sales features, ensuring scalability and user-friendliness. Provide a brief overview of the proposed design.

D.1. FLOWCHART

This flowchart outlines the user experience in the CRM system, beginning with authentication and directing users to a dashboard with modules like Contact Management, Ticketing, Reporting, and Sales Tracking. Users can add, edit, or delete contacts, log tickets, access various reports, and utilize integrated sales tracking functionalities. The process concludes with a secure logout.



D.2. PROPOSED GUI MOCKUP

Below is a snapshot of an early-stage mockup of the CRM user interface.

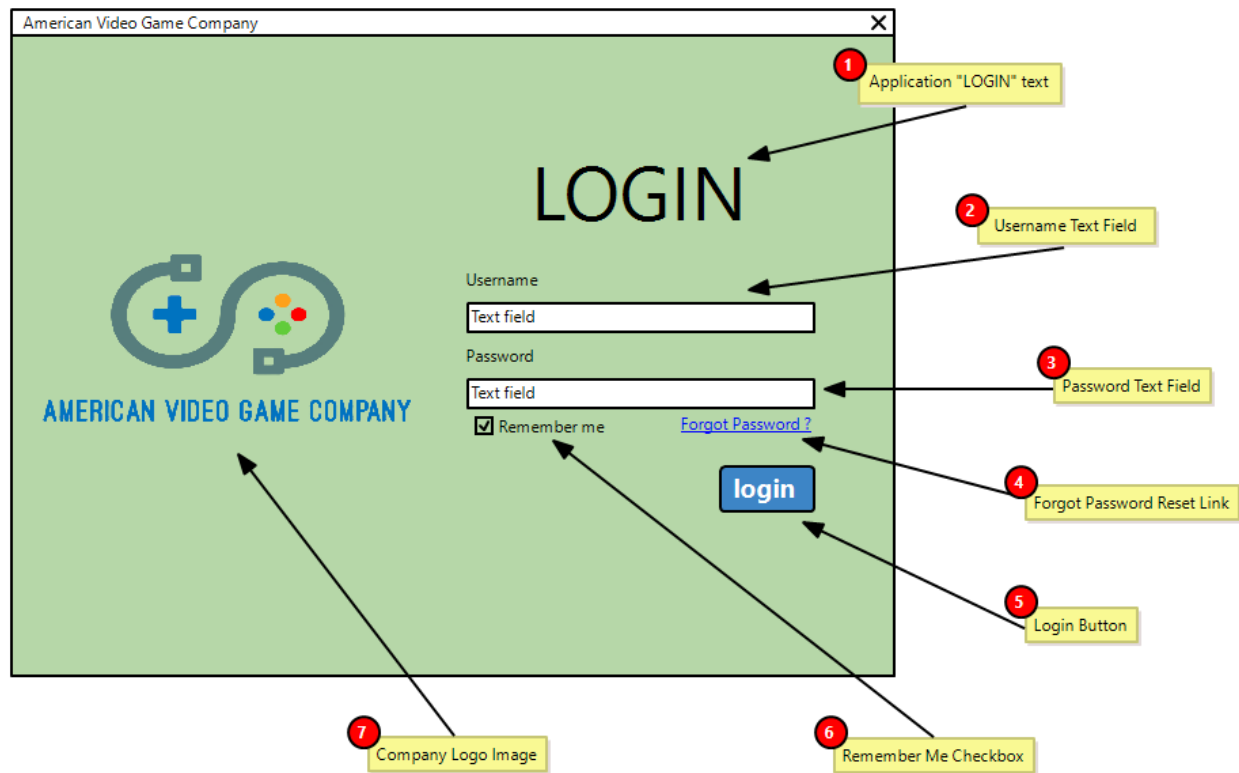


Figure 2: Sample GUI Mock-up

GUI Control Mapping			
ID	Control	Property	Data Source
1	Textbox	On application open text = "LOGIN" or null	NA
2	Textbox	On click of button text = "" User enter Username	Internal Variable
3	Textbox	On click of button text = "" User enter Password	Internal Variable
4	Link	On click of Link text to reset Password screen	NA
5	Button	On click to Login using Username and Password	NA
6	Checkbox	On click Checkbox to remember username an password	Internal Variable
7	Image	On application Image = PNG file	NA



E. TESTING

The proposed testing solution aims to ensure the robustness, functionality, and security of the Customer Relationship Management (CRM) system for the American Video Game Company.

E.1. FUNCTIONALITY TESTING

Testing will be conducted across three distinct functionality aspects to guarantee the system's reliability and performance. The testing areas include: **Functional Testing - User Interface (UI), Performance Testing – Scalability, Security Testing - Data Access Control.**

E.1.1. FUNCTIONAL TESTING - USER INTERFACE

Requirement to be tested.

Feature: "Remember me" Checkbox Functionality

Preconditions:

1. The CRM system is accessible, and the login screen is displayed.
2. The "Remember me" checkbox is present on the login screen.
3. User credentials (username and password) are valid for login.

Steps:

1. Launch the CRM system and navigate to the login screen.
2. Enter valid user credentials (username and password).
3. Observe the "Remember me" checkbox on the login screen.
4. Check the "Remember me" checkbox.
5. Click the "Login" button to log in.

Expected Results:

- The system should log in the user successfully.
- Close and reopen the CRM system, returning to the login screen.
- Verify that the username field is pre-filled with the previously entered username.
- The "Remember me" checkbox should remain checked.
- Enter the password and click the "Login" button.
- The system should log in without requiring manual entry of the username again.



Pass/Fail:

- **Pass:** The system behaves as expected, and the "Remember me" functionality retains the user's information across sessions.
- **Fail:** The system fails to retain user information, or the checkbox does not function as intended.

E.1.1.2. PERFORMANCE TESTING - SCALABILITY**Requirement to be tested**

Feature: Scalability - Handling Concurrent Users

Preconditions:

1. The CRM system is installed and configured.
2. The system has been optimized according to recommended performance guidelines.
3. A performance testing environment is set up to simulate a variable number of concurrent users.

Steps:

1. Start with a baseline test: Simulate 100 concurrent users accessing the CRM system simultaneously.
2. Measure the system's response time and resource utilization during the baseline test.
3. Gradually increase the concurrent user load to 300 and repeat the test.
4. Continue to increase the concurrent user load in increments (e.g., 500, 700, 1000) and perform tests at each level.
5. Monitor the system's response time, server resource consumption, and any signs of degradation.
6. Record the results and note any issues, such as increased response time or resource saturation.

Expected Results:

- The system should maintain acceptable response times even as the number of concurrent users increases.
- Resource utilization (CPU, memory) should be within acceptable limits.
- No signs of system degradation, such as increased error rates or timeouts.



Pass/Fail:

- **Pass:** The system demonstrates scalability by handling increased concurrent user loads without significant degradation in performance.
- **Fail:** The system shows signs of degradation, such as increased response times, errors, or resource saturation, indicating scalability issues.

E.1.3. SECURITY TESTING - DATA ACCESS CONTROL

Requirement to be tested.

Feature: Data Access Control - User Permissions

Preconditions:

1. The CRM system is installed and configured with user roles and permissions.
2. User accounts are set up with specific roles and associated permissions.
3. A testing environment is available for security testing.

Steps:

1. Log in with a user account assigned to a specific role (e.g., Sales Representative).
2. Attempt to access data or features outside the scope of the assigned role.
3. Verify that the system denies access to unauthorized data or features.
4. Log in with an administrative account with higher permissions.
5. Attempt to modify or access sensitive data that is restricted to certain roles.
6. Confirm that the system allows access and modification for the administrative account.
7. Attempt to perform actions that require elevated permissions without the necessary authorization.
8. Confirm that the system denies access to actions outside the user's permissions.

Expected Results:

- Users with lower roles should be restricted from accessing or modifying data outside their assigned scope.
- Users with higher roles, such as administrators, should have unrestricted access to data and features.
- The system should generate appropriate error messages or notifications for denied access attempts.



Pass/Fail:

- **Pass:** *The system accurately enforces data access control based on user roles and permissions.*
- **Fail:** *Users can access or modify data outside their authorized scope, indicating a security vulnerability.*



F. SOURCES

1. Lotz, Mary. "Waterfall vs. Agile: Which Methodology Is Right for Your Project?" *Segue Technologies*, 20 Nov. 2018, www.seguetech.com/waterfall-vs-agile-methodology/. Accessed 15 Nov. 2023.
2. Stephens, Rod. *Beginning Software Engineering*. Indianapolis, In, John Wiley and Sons, 2015.

