

# Design Proposal Documentation



American Video Game Company

## CRM Design Proposal

Software Engineering – C188

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12-11-2020

[Version 1.0]



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## A. INTRODUCTION

Due to our increase sales over the last two fiscal years American Video Game Company is quickly outgrowing our current customer relationship management (CRM) system. Our customer service and sales departments will benefit from implementing an internal customer relationship management (CRM) system.

### A.1. PURPOSE STATEMENT

Our team is implementing a new CRM capable of being integrated with our current systems we have in place while including the foresight of its integration for future systems, infrastructures and user and business needs. This will allow American Video Game Company to maximize our scalability, upgradability and useability while keeping our solutions on-site.

### A.2. OVERVIEW OF THE PROBLEM

American Video Game Company sales over the last two fiscal years have increased 42% and we have outgrown our current Zendesk CRM solution. When we implemented Zendesk, we were looking for an affordable solution for our startup. Our highly talented game developers and designers have helped enable us to maintain the top position in video game industry the last four years. We have expanded into different product segments and marketing mediums. And we have a deal with John Swards, one of the most famous movie producers in Hollywood to produce a box office buster based upon two of our most popular games. We are desperately in need of a new CRM capable of handling our new high volume of diverse sales.

The current CRM is incapable of handling the number of concurrent users required and is not scalable. At the present time, the server hangs, or crashes after ~260 users are logged in simultaneously. The current CRM does not work properly with FireFox or Safari. We have had overwhelming feedback from users requesting the ability to track their sales and activities.

### A.3. GOALS AND OBJECTIVES

To ensure our new CRM can scale and evolve with our sales over the next fifteen years, we require the new system to have the following implementations:

1. Must be hosted internally and noninvasive to current infrastructure
2. Must be able to handle load of 2,000 users, 500 of which are concurrent
3. Must be compatible with today's top browsers
4. Must be able to manage activities and track sales on a representative and managerial level
5. Must be easily scalable and upgradable



#### A.4. PREREQUISITES

Number	Prerequisite	Description	Completion Date
1	Budget	A development team of 15 has been hired	12/05/2019
2	1	Q&A session with Sales Reps and Managers	01/10/2019
3	1,2	Compile and prioritize data	03/28/2020

#### A.5. SCOPE

These items are in scope:

- Must be hosted internally and noninvasive to current infrastructure
- Must be able to handle load of 2,000 total users and 500 concurrent
- Chrome and Chromium 87.0.4280, Firefox 83.0, IE 9 and above, iOS7 Safari, iOS7 Chrome, iOS7 Firefox, and Android 4.0 Chrome
- Must be able to manage representative activities and track their sales
- Must be scalable to accommodate increased business needs

These items are out of scope for this proposal and will be revisited in the future:

- Access to the system by 3<sup>rd</sup> party marketing companies under contract
- Integration with other systems to allow for sharing of data
- Enablement of “soft delete” data

#### A.6. ENVIRONMENT

We have considered cloud-based solutions. Because we have infrastructure that was established before we considered AWS, Azure and Google Cloud solutions. And because we would like to have total control over our customer data and already have Cisco ASAs incorporated within, we have decided to add maintain all servers on-site. This will also allow us to have more control over our SLAs.

## B. REQUIREMENTS

The following requirements must be considered when developing the CRM.

### B.1. BUSINESS REQUIREMENTS

**Must be hosted internally and noninvasive to current infrastructure:**

Our CRM will utilize the current network infrastructure, however, will be hosted on a dedicated rack server. This will help ensure we are able to maintain an internal SLA of 99.9% uptime and there will be no compatibility issues with the company's infrastructure currently in place. This will allow us to avoid internal downtime due to ISP or cloud host. The new CRM will be hosted on a dedicated server running Windows Server 2019.

### B.2. USER REQUIREMENTS

**Must be able to handle load:**

The CRM must be able to accommodate 2,000 users, while allowing for 500 concurrent users at any given time. To ensure we are able to comfortably accommodate 500 concurrent users, we plan on running Windows Server 2019 on a Dell EMC PowerEdge R640 rack server with 192GB of NVDIMM. The specifications of this server should also allow the VM to run all 500 concurrent users with little to no lag. To reduce latency, we will run 2x1GbE link to the company network. We used Apache JMeter to stress test load. The stress test will be considered successful we can maintain 600 threads without HTTP 200 response codes, a throughput higher than 500 and a deviation lower than 3000. See section E.1.2 for test results.

### B.3. FUNCTIONAL REQUIREMENTS

**Must be compatible:**

To ensure compatibility with the latest browsers, the CRM must have browser support for the following:

- Chrome and Chromium 87.0.4280
- Firefox 83.0
- IE 9 and above
- iOS7 Safari
- iOS7 Chrome and Firefox
- Android 4.0 Chrome

To ensure compatibility with these browsers, we will be using cross-browser compatible libraries and frameworks. We will use the library or frameworks documentation to determine this. During development, we have tested the compatibility by using LAMDATEST cross browser testing solution. See section E.1.1 for test results.

**Must be able to manage activities and track sales:**

The CRM needs to be able to track our representatives' activities and sales. Managers should be able to view their team's sales and activities. Individual representatives should be able to view their own sales and activities. This data should be able to be viewed based on today's date, MTD, QTD, YTD, and by custom date range. See section E.1.3 for test results.

#### B.4. NONFUNCTIONAL REQUIREMENTS

**Must be scalable:**

The CRM must have the ability to scale up with the business needs. We expect that it can handle 2,000 users while also allowing for 500 concurrent users at any given time. This fits our projected growth requirements for the next ten years. After which, we expect that our growth will increase at a rate of 10% per year. Because of this, we will need the ability to increase the total number of users and total concurrent users.

The CRM will be scalable via hypervisor. We will create a Hyper-Converged cluster between two identical rack servers. Both of which will serve as a node in the cluster. This will allow us to combine the power, resources, and throughput. Both of the servers will have two 1GbE links to the company network for a total of four. Both racks will be connected to one another via two 10GbE links on the 10.10.101.0/24 and 10.10.102.0/24 subnets.

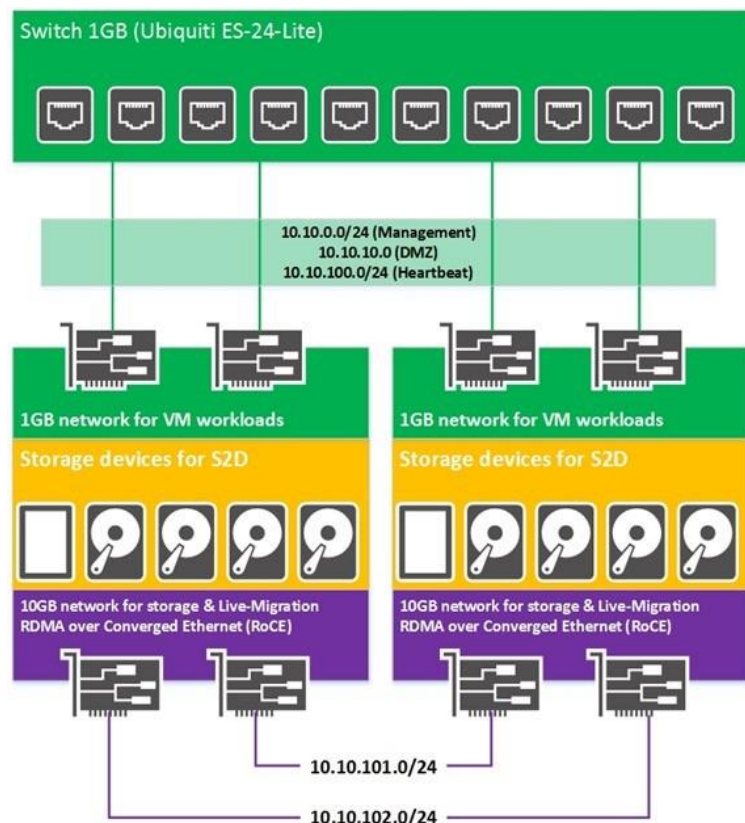


Figure 1: Scaled Hyper-Converged (Hardware Stage 2) (Tech-Coffee, n.d.)

### C. SOFTWARE DEVELOPMENT METHODOLOGY

The company has selected the waterfall software development methodology for this project.

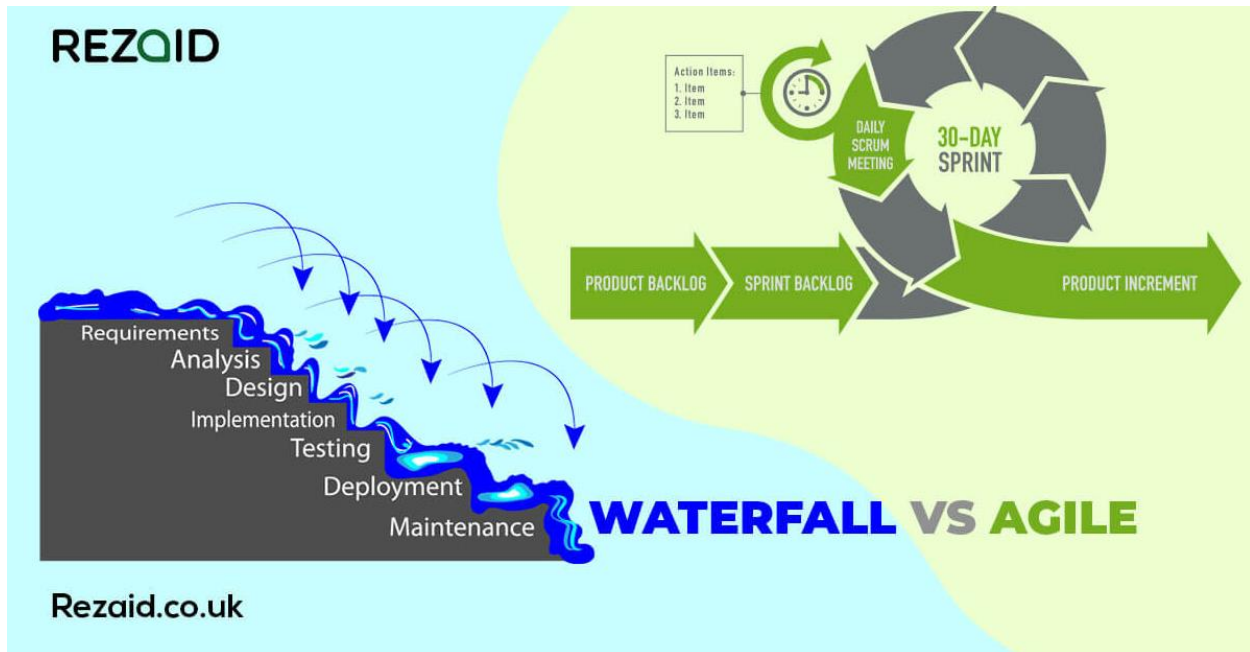


Figure 2: Waterfall vs Agile (REZOID, n.d.)

#### C.1. ADVANTAGES OF THE WATERFALL METHOD

The advantage of the waterfall method is that we plan before we start a project. This allows us to determine the requirements before we start and what we may expect to cause us headaches down the road. It is also easier to determine a cost estimate for the project's development. It will require less micromanaging of each phase and allow our developers to complete big pieces of the project in less time (TrustRadius, n.d.). Development will only take a fraction of the time as it would under an Agile development process. Documentation would be superior to Agile and would include each phase of the process.

#### C.2. DISADVANTAGE OF THE WATERFALL METHOD

Because we plan before we start, it can be difficult to implement changes in the middle of development as any change can impact the plan in place. If too many changes are made in the middle of development, it might throw off the project and require the team to start from the beginning. The waterfall technique also has a great deal of documentation involved. This is due to having a very structured, well thought out design and implementation plan prior to starting the work.

### C.3. ADVANTAGES OF AGILE

The Agile development process would add flexibility to our continued development. It also allows us to test it after individual “Sprints” and determine if anything else should be implemented or changed before we continue the development. Agile is ideal for small development teams who communicate often and in parallel (guru99, n.d.).

### C.4. DISADVANTAGE OF AGILE

Agile development can be a time-consuming endeavor. It can also require a great deal of micro-management to keep everyone on the same page as the process evolves. Because of this, it also is best that all developers be on site daily. Keeping in constant communication to avoid potential issues during the development process (TheRefinerySource, n.d.).

### C.5. BEST SUITED

We have decided to go with the Waterfall method for the purposes of this proposal. This allows us to ensure we efficiently deliver on what we promise while avoiding messy code that will forever become incorporated within our CRM’s foundation. The CRM should also be easy to build upon and upgrade later down the road by anyone who is added to our development team, as the documentation will be clear and concise for anyone who is tasked going forward.



## D. DESIGN

The GUI is very user friendly and intuitive. The interface has a familiar interface to those who have previously used Salesforce or some of the more popular web-based subscription-based CRM solutions. Below is a GUI mapping of the login screen and a screenshot of the dashboard.

### D.1. GUI DESIGN

The image shows a login form titled "Log in with your AVG email account". It contains the following elements with numbered callouts:

- 1**: Points to the Email input field containing the placeholder text "name@americanvideo.game".
- 2**: Points to the Password input field containing the placeholder text "Password".
- 3**: Points to the "Show Password" checkbox, which is currently checked.
- 4**: Points to the blue "Login" button.
- 5**: Points to the "Forgot your password?" link.

Figure 3: Login GUI Mock-up

GUI Control Mapping			
ID	Control	Property	Data Source
1	Textbox	On application open text = "name@americanvideo.game"	Internal Variable
1	Textbox	On click of button text = "" or null	NA
2	Textbox	On application open text = "Password"	Internal Variable
2	Textbox	On click of button text = "" or null	NA
3	Checkbox	On click enable checkbox and show password	Internal Function
4	Button	On click verify credentials with database values	Internal Function
5	Button	On click open "Forgot your password" form	Internal Function

The following dashboard view is showing the Sales>Today's Contacts screen.

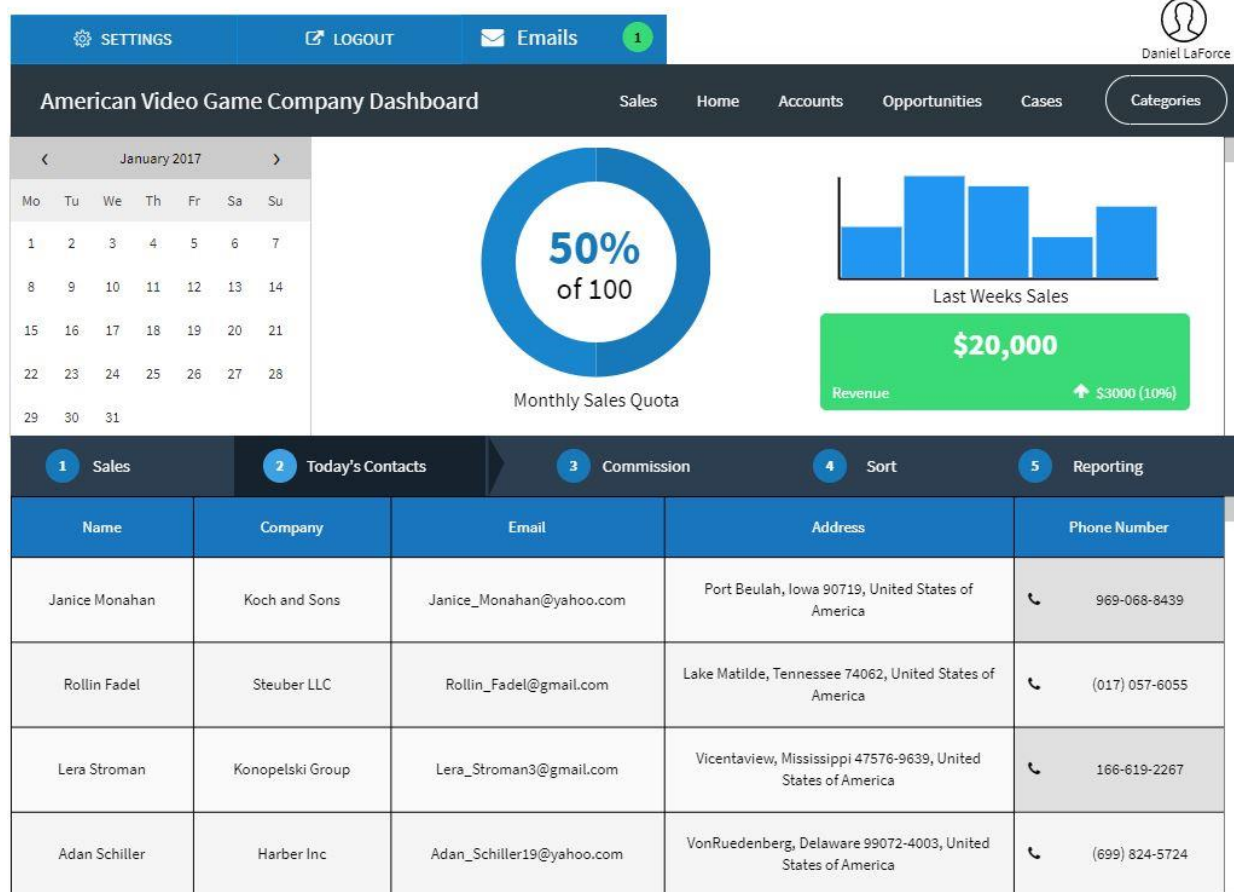


Figure 4: Dashboard GUI Mock-up

## D.2.DATABASE UML ERD

The following UML ERD diagram shows the relationship between the SQL tables and foundational fields.

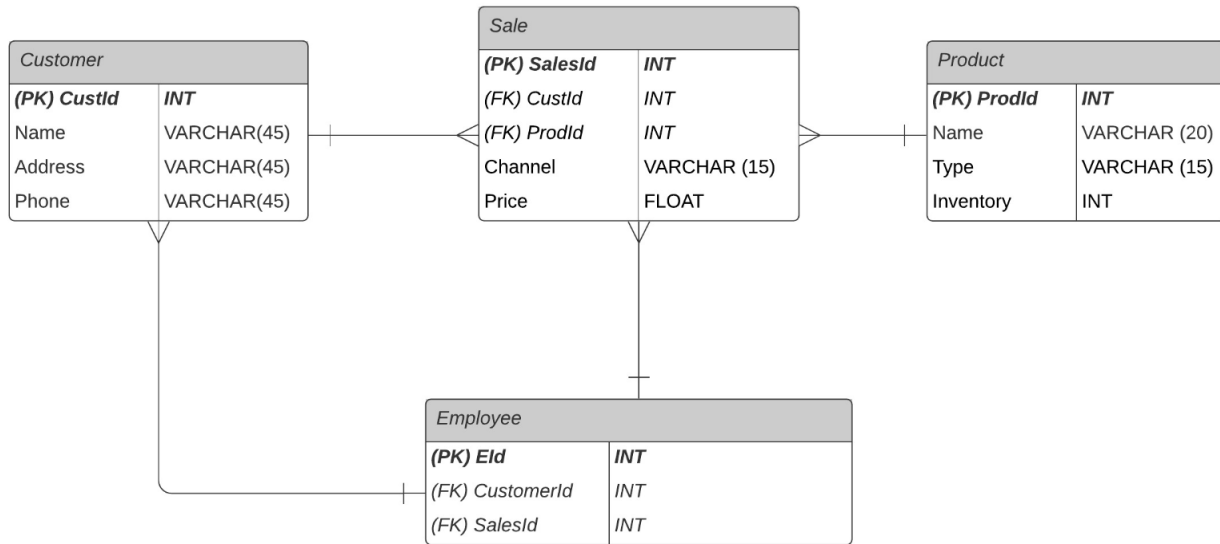


Figure 5: Database ERD

## E. TESTING

Provide a brief introduction to the proposed testing solution. The tests need to be from 3 completely different functionality aspects. Testing the same aspect with slightly different criteria is not acceptable.

### E.1. COMPLETED TESTS

The following tests have been conducted and have successfully passed.

#### E.1.1. BROWSER COMPATIBILITY

##### CHROME, FIREFOX, IE AND SAFARI

Requirement to be tested

The following browsers must be compatible: Chrome/Chromium 87.0.4280, Firefox 83.0, IE 9 and above, iOS7 Safari, iOS7 Chrome and Firefox, Android 4.0 Chrome

Preconditions: Conditions that must be present before test case can successfully run

- Web server must be accessible via internet or company network
- CRM must be accessible via internet or company network

Steps: The steps the tester must execute to test the feature.

1. Login to lamdatest.com with our testing account credentials
2. Click on "Real Time Testing" on the left navigation bar
3. Type in CRM URL homepage into "Place your URL" text box
4. Select platform (Desktop or Mobile)
5. Select browser, version, OS and resolution
6. Click Start

Expected results: It is expected that the GUI looks and acts similar with all browsers and platforms

Pass/Fail: Pass

#### E.1.2. PERFORMANCE LOAD TEST

##### 2,000 TOTAL AND 500 CONCURRENT

#### Requirement to be tested

It is required that 2,000 total and 500 concurrent users must be able to use the CRM.

#### Preconditions:

- Java 7 must be installed
- Apache JMeter must be installed

#### Steps: The steps the tester must execute to test the feature.

1. Add Thread Group (Number of threads: 100, Loop Count: 6, Ramp-Up Period: 10)
2. Add JMeter elements
3. Add Graph result
4. Run Test (guru99, How to Use JMeter for Performance & Load Testing, n.d.)

Expected results: No HTTP 200 response codes. A throughput higher than 500 and a deviation lower than 3000.

Pass/Fail: Pass

### E.1.3. ACTIVITIES AND SALES TRACKING

#### MANAGING ACTIVITIES AND TRACKING SALES

Requirement to be tested

CRM must have the ability to manage activities and track sales.

Preconditions:

- Must have a user account with “Representative” user role to view individual activity and sales
- Must have a user account with “Manager” user role to view their team’s activity and sales
- At least one sale or activity must have been made by a representative

Steps: The steps the tester must execute to test the feature.

1. Login with representative or team’s manager account who has data to track
2. Click on “Sales” on the dashboard
3. Click on (1) Sales to view sales for today, MTD, QTD, and YTD, or (2) Today’s Contacts to view today’s contact activity or (4) Reporting to pull custom reports on specific sales and activity
- IF PULLING REPORTS**
4. Select the custom time frame using the calendar
5. Select specific activity or sales type under “Report”
6. If testing under account with “Representative” role, click “Run”
7. If testing under account with “Manager” role, select “Team” or specific representative’s name under drop down menu
8. Click Run

Expected results:

**(1) Sales Tab:**

You should see total sales for today, MTD, QTD, and YTD for the individual representative if viewing under an account with “Representative” role. If viewing with “Manager” role, the user should see the full team’s sales.

**(2) Today’s Contacts Tab:**

You should see a list of contacts made today for the representative if viewing from a user with the “Representative” role. Likewise, you should see the total list of contacts made by team if viewing from an account with “Manager” role.

**(4) Reporting Tab**

After clicking “Run”, you should see the desired activities or sales for the individual representative for the custom date range if viewing from an account with “Representative” role. If viewing from an account with the “Manager” role, you should see the desired activities or sales for the desired date range for the team or individual user as selected.

Pass/Fail: Pass

**E.1.4. 99.9% UPTIME SLA**

**99.9% UPTIME RELIABILITY**

Requirement to be tested

Server uptime of 99.9%

Preconditions: Solarwinds must be installed on server and recording uptime data. Server must be up for 30 days.

Steps: The steps the tester must execute to test the feature.

9. Open Report Writer (C:\Program Files (x86)\SolarWinds\Orion)
10. Under existing reports, select Historical – Availability Details
11. Under Time frame, select the “Last 1 Month” option
12. Go to Select Fields and add any related information
13. Preview report and save (solarwinds, n.d.)

Expected results: Uptime of at least 99.9%

Pass/Fail: Pass



## F. SOURCES

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