Project: Dealership Management System

CSE 5325 – Fall 2019

Project Management

Module: Project Scope & Feasibility

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1. Introduction and Executive Summary

UNO auto motor is a successful automotive dealer company located in The Heart of Texas - Brady city and has been expanding greatly throughout the state of Texas over the past 10 years. In this process of expanding the company, they wish to have a new Web Page through which the customers could take a look at variety of automobiles they offer and also to help their employees to get accustomed to these changes quickly and smoothly, this Web Page would also contain the company's internal web application through which the employees could maintain the details of the customers as well as analyze the details related to the sales.

We at Web Lab Technologies and solutions are focused on providing a spectrum of web-based solutions and services aimed at helping our customers gain a competitive edge and stay ahead of the curve. By understanding the requirements of UNO auto motors our team at Web Lab has come up with a solution of implementing a Dealership Management System (DMS).

Dealership Management System is a website that allows the customers to look at different ranges of automobile models and compare them in terms of their make, features, cost etc. In addition to that it would also allow employees to login to the web portal, keep track of the customers and their orders, add or delete different models and makes of the automobiles sold through the dealer company, analyze the profits made by the company through the sale of the automobiles and also to keep personalized notes about different information such as requests, to-do items, etc.

The website must be up and operational by December 3rd, 2019. While developing the website we undertake various tasks such as Requirement gathering, Architecture review, System design, Coding, Integration and testing which has been outlined in this document. Since we are having the initial set of minimum requirements for this project, we would use the Waterfall model.

Through this project we aim to provide the dealership company with website which would increase their customer base and also provide the dealership company with a secure internal web application, which not only helps their employees but also would help them to organize their inventory.

By doing this project we get to expand our foothold in the Texas state. This project also allows us to expand our knowledge in the new domain (automotive dealership) giving us the right toolset to grown in dealership ventures.

2. Objectives

2.1 BUSINESS OBJECTIVES

The following is the list of business objectives:

Objective 1: Market share – increase our company's share in the market by establishing online presence for both customer and retailer dealers.

Objective 2: Become #1 player in the segment and also build the company's brand name.

Objective 3: Welcome Page – Containing details regarding the company like "Who are we", history, board of directors, our investors, list of addresses for all its current location stores with working hours and contact info.

Objective 4: User Registration – To access the company's internal web application the employees must enter their personal information such as badge #, name, gender, department, username, password, etc. and register. To access the DMS, the customers and the makers can register themselves by providing their information.

Objective 5: Login – The end user (Employee/Merchant/Customer) will get a new Log-In portal with two factor authentication system to verify the genuineness of the user that is logging into the system in order to avoid any falsifying/altering of customer information. Based on the user he/she will be redirected to the appropriate website or webpage.

Objective 6: Employees Landing Page (company's internal web application) – On successful Log-In employees can perform the following operations:

- CURD operations on Customer Data, Makers Data and models.
- Allowing them to create ID's for new makes and approving the changes that makes requested by existing makers.
- View the entire inventory of autos for the employees to refer.
- Personalized notes – Allows employees to keep personal notes about requests, questions, to do items, etc.
- Search – Allows for the search of customers, makers, models and sales
- Maintains detailed records about all sales, employee details, customer details including booking and appointments and also access the analytical tool to visualize this data.

Objective 7: Makers Landing Page – On successful Log-In the makers are allowed to raise request to update their portfolio details like adding new car or model, Updating prices of existing model, special offers, etc.

Objective 8: Customers Landing Page – On successful Log-In customer will be redirected to a customer site where he/she can do the following.

- View all the makers and model with search functionality.
- Update his details/personal information.
- Book appointments at the dealer location.
- Book test ride at specific location (Additional).
- Deactivate or Delete his profile (GDPR compliance).

Objective 9: Business: The goal is to build up the company's brand in the near future. The objective is to increase sales of automobile by 10 percent by the second quarter of next year.

Objective 10: Audits: Provide complete audit logs for ever CURD operation that occurred on the new Web-Site. This not only server for compliance purposes but also for roll backs, technical audits and server maintains.

2.2 SYSTEM OBJECTIVES

The following is the list of system objectives:

Objective 1: This Project is a web-based application with all device browser compatibility (Desktop, Mobile and Tablets), allowing ease of access to customers, makes and employees, thus maintaining portability.

Objective 2: To migrate all data from old excel, csv and databases information to newer ones to provide scalability, security and load balancing features. This data base will be used to storing customer data, employee related data, details regarding the sale of automobiles, inventory records for website

Objective 3: The website and database will be hosting in client's premise. A public IP is required at client's location with internet bandwidth of 1GB/s to handler multiple end user requests.

Objective 4: Maps API (Google or open source maps) will be integrated into the DMS so that the customers can locate the nearest dealership store.

Objective 5: For generation of reports regarding the sales, analytical tool to be associated with the system.

3 Project Feasibility, Risks and Metrics

Project feasibility and metrics are summarized below:

3.1 Project Feasibility Concerns

Market readiness:

Since the advent of online shopping, number of shoppers are using these online sources to expand their purchasing options, as well as a great way to compare and research about the products and their prices. Implementing a price-comparison website makes deal hunting easier and also help guide shoppers to the best rated automobiles with the good reputations by posting reviews and performance rating of the automobiles submitted by other shoppers.

Also, by having and internal web application would help the employees keep track of the orders of customers, details of sales and other records easily on the server and would eliminate the usage of papers and the chances of making mistakes while taking customer orders.

Taking consideration into all these points and providing a good website which includes all these functionalities and having an attractive UI would surely help the business.

Technical issues:

Since the software is hosted within the company's own datacenter, security and power volatility are some of the major technical issues. Hence necessary steps like providing redundant power backups, for example: uninterruptible power supply (UPS) device and by installing security information and event management tool (SIEM) are to be taken to ensure the prevention of such issues.

Resources:

As we would be using company's own datacenter any technical issues would result in the outrage of the datacenters. Hence an additional backup server would ensure business continuity, data integrity, and security.

Cost:

Cost of the website will be defined on the basis of whether the website for the company will be done from scratch or by building the website in a modular way and then combining the modules/pre-defined modules into the whole system depending on the client requirement.

Time to market:

We have three months of time between product being conceived until its being available for the use of our client and to the customers which is vigorous. Hence, we need to create a product which includes various kinds of development support, creative development and also focusing more on efficient resource management, as it may improve time-to-market.

3.2 Project Risks

1. As the software is being hosted on the company's own datacenter, one of the major risks is that the datacenters may be subjected to security breaches.

The company can prevent the breach by:

- Implementing the physical security of a data center which is the set of protocol built-in within the data center facilities in order to prevent any physical damage to the machines storing the data. Ex: Three-factor authentication, CCTV security network, etc.
- Virtual security is security measures put in place by the data centers to prevent remote unauthorized access that will affect the integrity, availability or confidentiality of data stored on servers. Ex: Heavy data encryption, Two-factor authentication, etc.

2. Another major risk which the company's datacenter may face is the power volatility issues such as power outages, whether blackouts, spikes or brownouts.

The company can prevent this issue by making sure that system is covered by providing redundant power backups – a standalone generator (or two), for example, or an uninterruptible power supply (UPS) device. Also, company can install backup servers which would helpful during such situations.

3. Going over the assigned budget during the project development time.

This may be due to unpredictable events such as employee leaving the team, damaged hardware/software resources. This can be controlled by using opensource software wherever possible.

4. Unauthorized users releasing critical information regarding the customers and sale of the automobiles.

Two factor authentication system will be used to prevent such unauthorized users getting into the system.

5. Lesser number of efficient web developers in the team who are well versed in recent development technologies.

Hiring new people into the team who have experience in that domain.

6. As the web application must be highly available, there might be risks of resources being redundant.

This could be controlled by having additional standby resource take over when the active component fails.

3.3 PROJECT METRICS

1. The website should be able to handle 500 simultaneous connections at any given time without any errors.
2. Since DMS is a web-based application, it must load properly on all devices without scaling issues.
3. As the system would be integrated with analytical tool it must generate proper reports of the sales to the employees and also suggest customers to the automobiles based on their previous selections.
4. Functionality metrics –
    - Whenever a maker raises a request employee/Agent will get the email and on approval or decline of the request, Maker will get the notification through the mail.
    - Whenever the customer books an appointment/ pre-books a vehicle/ books for a test ride an agent is automatically assigned based on the time and location, both the agent and the customer will get an email notification with RSVP calendar sync
5. The application must be user friendly in order provide great customer experience so as to increase the number of customers visiting the website from any device.

4 Project Scope and Process Model

The Project scope is derived from the objectives provided are as follows.

4.1 PROJECT SCOPE

4.1.1 WEB SITE (UI) AND SERVER

0. Provide an easy to use and multi device compatible UI.
1. Servers to be hosted on services like Tomcat or JBOSS with NGINX integration for scalability.
2. Customer functional requirements
    - Self-Registration page for customer.
    - Customer can search for models based on set of criteria's (Vendor, Year of release, Top speed, Average Mileage, etc.).
    - Customer can book appointments and test rides. He can also view the history of appointments.
3. Merchants functional requirements
    - Merchants/Venders has access to the only the external system and can raise request to on the webpage to change details about their listing and portfolio.
    - Only after the employee has created a Vendor id with USER-NAME and PASSWORD. Where on first log-in the password change is requested.
4. Employee functional requirements
    - Roles will be assigned to employees which can be edited by the admin. These roles will provide CRUD rights for the Employee. Example If an employee has roles as "CUSTOMER-RELATION" he can only view customer data which is necessary to perform his tasks and not the sales data or vendors data.
    - Employees will still have access to the internal server/ internal web application though DMS system
    - Provide dashboard and analytical tool to employee for generating reports and sales figures. This also includes SMTP mailing functionality to directly send mail on a set frequency.
    - Calendar like features to be added so that employees can add notes, schedule meetings and auto schedule customer appoints to sync with their existing schedule.

4.1.2 SECURITY

Security should be provided at 3 layers

- Application layer using HTTPS (Providing by a valid CA).
- Login using 2 step authorization (OTP via mail or mobile no).
- Data encryption with AES-256 Encryption.

4.1.3 BACK END FRAMEWORK

1. Migrating data from legacy system to newer database to provide stability and upgradability.
    - Moving data from Excel and csv to Database (Sales numbers and employee details).
    - Using MySQL (Open Source) or MSSQL (Paid) to provide multiple query handling and later down the line proves the client with easy path to upgrade the system.

2. Data base with normalized table to be created for easier access of data.

4.1.4 OTHER

1. Training for employee to use the software.

4.1.5 OUT OF SCOPE

1. Any TAX related issues.
2. Post project maintenance issues.
3. Any vacation and social and health insurance costs.
4. Any contract negotiation and legal concerns.
5. Cost of infrastructure as it is hosting in the data warehouse (Internet, Systems, etc.).

4.1 PROJECT PROCESS MODEL

As the requirements for the internal web applications have been clearly defined and there wouldn't be much changes or deviations from the minimum requirements listed by the clients, hence we would be using the Waterfall model in the project.

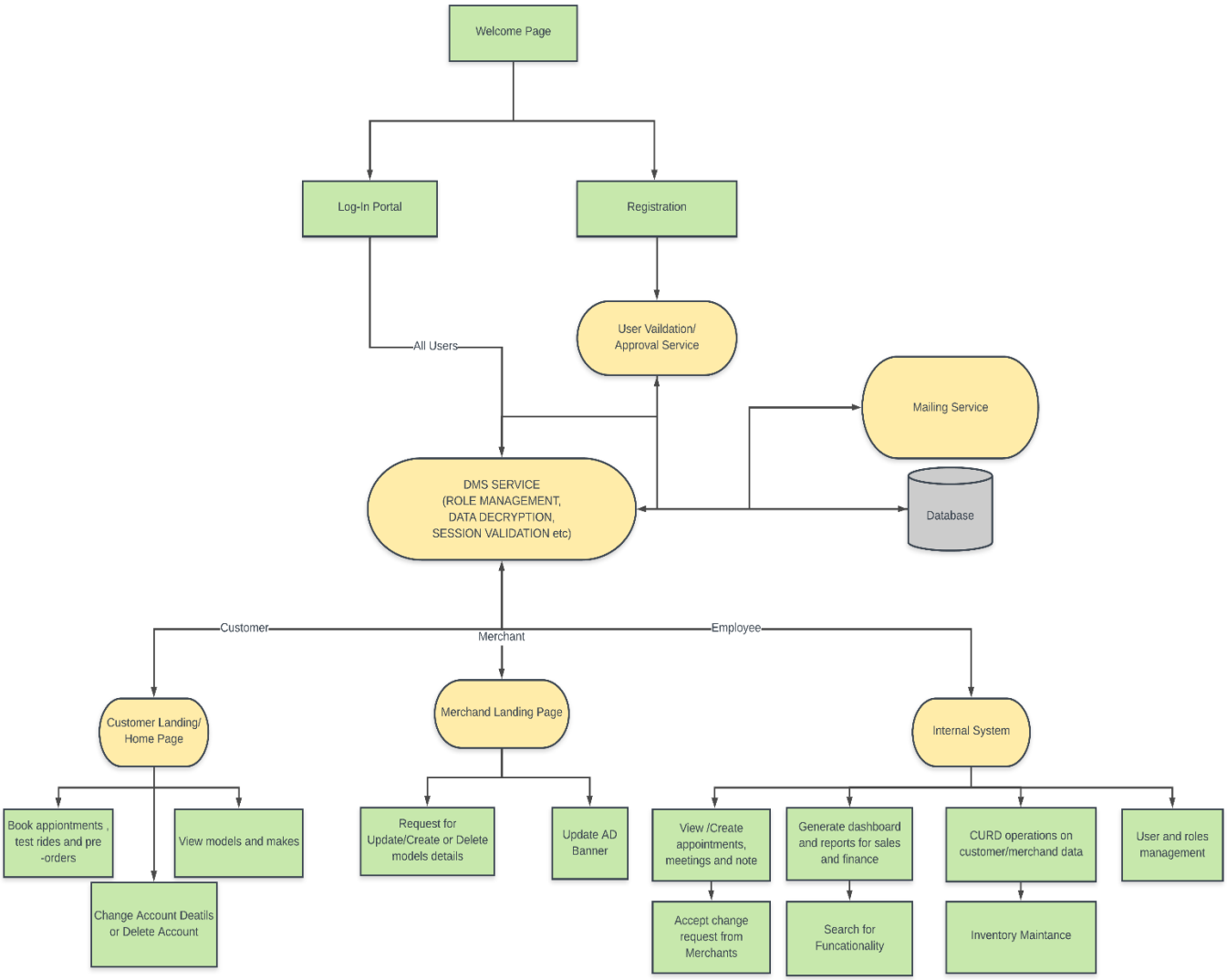
By using the Waterfall model, we will have the following advantages:

1. This model is simple and easy to understand and use.
2. It is easy to manage due to the rigidity of the model – each phase has specific deliverables and a review process.
3. In this model phases are processed and completed one at a time. Phases do not overlap.
4. Waterfall model works well for smaller projects where requirements are clearly defined and very well understood.

Some of reasons for not using the Agile method instead of waterfall model is:

1. The requirements for the website are fixed and there wouldn't be any major changes which would be added to the application.
2. As the customers for our project are employees of the client company and they wouldn't be able to involve throughout the Project implementation discussion. Hence, we wouldn't be able to use Agile methodology.
3. The close working relationships in an Agile project are easiest to manage when the team members and the clients are located in the same physical space, which is not always possible.

4.2 PROJECT CONTEXT



5. Assumptions and Constraints

5.1 ASSUMPTIONS

The following is a list of assumptions:

- All the users of the website are over the age of 18.
- Software is hosted within the client's own datacenter.
- The bare minimum requirements listed by the clients are fixed and does not deviate completely.
- The web application needs to be highly available to the employees of the client company and to the customers.
- Resources are skilled in Bootstrap, DB and designing of interactive UI.
- The system must be able to handle minimum of 500 simultaneous connections at any given time.
- Customers do not gain access to the company's internal web application.
- There wouldn't be any additional software licensing costs involved in creating of DMS system.

5.2 CONSTRAINTS

The following is a list of constraints:

- The project must be completed within 3 months (i.e. from Sept – Dec).
- Limited resources with limited knowledge in the trending technologies.
- Software being hosted on the client's own datacenter.
- The project completed with the allocated budget and with the allocated resources.

6. Project Tasks, Schedule and Cost

Overview of the project task, duration and cost:

- The project start date is Sept. 03, 2019
- The Project must be delivered before Dec. 03, 2019
- Hardware and licensing of additional software are too added by contacting the respective sales vendor of that service.
- Total cost is = $491,040 + Additional cost. The break up is given in 6.1 Cost Table
- Feel free to make reasonable assumptions when putting this project together, remember you are the manager and ask for you need.

6.1 COST SUMMARY

Item	Count	Cost	Description
Developer	10	$50/hour	Development of software
Tester	5	$40/ hour	Testing the software
DBA	2	$60/ hour	Migrating and building new database
Architect	1	$70/ hour	Management of project.
Implementer and trainer	1	$40/ hour + per diem + travel and stay.	Provide training for the employees on the date of delivery.
MSSQL DB	1	License cost	(ADD ON)
Hard-Ware	1	$0	Provided by clients existing warehouse infrastructure
Internet + Public IP +Certificate for HTTPS	1	$0 + Certificate cost	HTTPS certificate from CA for global access

The tasks that will be employed in the project are

1. Requirements – 4 days
    - Functions Gathering – 1 Day (understanding the client's requirements)
    - Project feasibility documentation – 2 Days (Writing document for project feasibility and scope)
    - Input Gathering – 1 Day (review with client)
2. System Design – 2 days
    - Architecture Review – 1 Day
    - Development explanation – 1 Day
3. Implementation – 40 days

- Login page + Welcome Page + registration + validation -15 days
- internal system – 11 days
- customer lading page + makers landing page – 14 days

During implementation phase the following activities will be carried out simultaneously:

- Testing team will start with initial doc and test case
- Implementation team will understand client's data from excel and csv and help the development team.

4. Integration and Testing – 20 days
    - Testing team will test the product.
    - Development team will fix the bugs.
    - Training will be given to the clients by the implementation team.

The total working days is 3 Months = 66 working days. Per day cost from the table is $930/hour. Therefore, total working cost comes up to $491,040 + additional cost.

7. Conclusion and Recommendations

By this DMS system the customer will have an online presence in the world and also new internal system for his employees which can be used for data visualization, user data manipulation and warehouse maintenance. The customers will have a web interface which will work on all devices in which they can book appointments, test-drive and pre-order. The merchants will also get a web interface where they can list their portfolio and request a change or update of the existing portfolio.

Recommendations:

- Use of Google Maps API for locations.
- Use of enterprise MSSQL DB for additional stability. Opening API's for Tableau or Power-BI
- Using Certificate Authority like GeoTrust or Symantec to generate and validate certificate

Appendices

Web References:

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