An Undergraduate Internship on Transport Management System as a Backend Developer

By

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Department of Computer Science & Engineering

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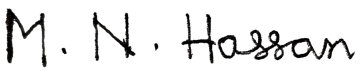
Attestation

Internship is a course offered in my university Independent University Bangladesh under its course code CSE499. This requires the student to do the internship in an organization where that student would do programming related works and gets introduced to the professional real-world system. My internship report portrays the results of my work and the experience I earned in my organization Flyte Solutions LTD. In my organization I was working under a project called Transportation Management System. This report focuses on background of my project, objectives, scopes, literature review, management and financing of my project, methodology, requirements, analysis, implementation, test cases, sustainability, ethical issues and my possible future works.



6th June 2024

Signature

Date

Mohammad Nurul Hassan

Name

Acknowledgement

I would like to thank my internship supervisor Saiful Alam Shumon from Flyte Solutions LTD(1) for all the help he had given in learning and explaining the concepts of Stack Programming with Laravel and Vue.js. I would also like to thank my academic supervisor from my university Md Shakhawat Hossain, PhD(2) who given all the privileges to do my internship freely and creating the opportunity to try to solve my internship problems by myself so that I can better in my works in real life. Furthermore I would like thank our internship coordinator from my university Subrata Kumar Dey for all the internship course related help I can get to do my internship successfully. It has been a great opportunity to get to work with experienced senior professional software developers in Flyte Solutions LTD. They help me learning the core concepts of Software marketing, how to satisfy a customer to get the preferred software for them. I learned a little bit of organizational team work, corporate pressure and policies. I would like to thank everyone in my workplace of Flyte Solutions LTD.

Letter of Transmittal

6th June 2023
Md Shakhawat Hossain, PhD
Assistant Professor
Department of Computer Science and Engineering
Independent University Bangladesh

Subject: Submission of Internship Report

Dear Sir, I am feeling honored and pleasure to submit the report of my internship from Flyte Solutions LTD which is also a CSE499 course in the Independent University Bangladesh.

By going through this internship course in my university and in the company Flyte Solutions LTD, I learned both academically and got a glance on the professional world of Computer Science.

This internship report conveys extreme appreciation for letting me do my internship course and learn so many things in my lifetime. I tried everything in my knowledge and skills to learn and develop myself which would have been impossible without your support and guidance.

Thanking you.

Mohammad Nurul Hassan
ID: 1522245
Department of Computer Science and Engineering
Independent University Bangladesh

Evaluation Committee

Supervision Panel

.....	.....
Academic Supervisor	Industry Supervisor

Panel Members

.....	.....
Panel Member 1	Panel Member 2
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Panel Member 3	Panel Member 4

Office Use

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Internship Coordinator	Head of the Department

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Industry Coordinator of the Department

Abstract

My internship report is about Transportation and Management System using Stack Programming of front end Vue.js 3 and back end of Laravel 10. Organization that deals with transportations can use my software to safely track their employee in their working business, efficiently providing data between departments in the organization to boost their business profits. It also gives the organization to efficiently handle their clients, provides security and mostly time efficiency. Although most of the functionality of the software was completed, a lot still remains left undone. There is a future possibility to use my software on larger Software as a Service development model which could be a small part of larger software. By going through developing this software, I faced errors from runtime all the time. By solving each error took a lot of time and became an unbelievable obstacle. But by going through this experience, I learned a lot which would not be possible in normal circumstances. This software gives tasks to the employee from administrator who takes care of the software. Records and tracks the loading and unloading timings by giving live status. It also shows the proof of completion of the delivery work to the administrator. Administrator also can record useful information about the employee, vehicles as well as assigning new tasks, vehicles and employee. Remove them, update any new information and remove them if required. Furthermore new administrators can be assigned which can take care of the software.

Keywords— transportation, organization, software, administrator

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Chapter 1

Introduction

1.1 Overview/Background of the Work

Before taking my internship course and working on Flyte Solutions LTD, I was already working with MERN stack and developed an online website. So I was confident that my organizational instructor would let me work on that further to boost my skill level. But my instructor insisted that I would work on a completely different project that I have never done before so that I would learn about programming from other topics as well. Thus lead to taking this project work. Thus began my watch of video tutorials as well as doing my job my supervisor wanted me to do at the office. During hard those times, my instructor and others in the company helped me as well giving valuable advice and sharing their experience. Thus, lead me to develop this project work. While time was short and not everything was done, but still, I did whatever I could do.

1.2 Objectives

The objective of my internship work is about Transportation and Management System using Stack Programming of front end Vue.js 3 and back end of Laravel 10 under Software as a Service development model.

One of my objectives is to find the specific location of the vehicles, boost up real time tracking of those delivery vehicles by means of modern electronic mechanisms. This could create better communications between each hierarchy level of employee. This consequently could lead to better team work, good working environment between employees.

Other objective would be to optimize the planning of the routes taken by the vehicles and with efficient booking of transportation services. As a positive consequence it could lead to lesser transportation and operational expenses.

Finally my overall objective is to eliminate redundancies and implementation of smart automation which would be user-friendly for everyone.

1.3 Scopes

The software program for my internship work has a lot of inconsistency. As my internship course was only about 3 months, so was my work in my company Flyte Solutions LTD. My supervisor wanted me to work more on the project with a longer span of time to build the software that would fulfill the objectives. As a consequence my software would remain incomplete even after my intern period is over.

Since I am working on a completely new programming language, it is difficult to speed up my work from the start. At first I learned the basics briefly for weeks and build small software from that. So it took a little bit more time.

As I am new to this programming language, so are my runtime errors, missing scripts, lack of system environmental variables, program crash and so on. This slowed down my time for fulfilling the objective.

There are some of the modules like tracking delivery trucks using API, uploading images for completion of work directly into the software, better user friendly software, user-friendly charts on dashboard and so on. My post internship goal is to would work on this project work and further fulfill the original objectives.

Chapter 2

Literature Review

2.1 Relationship with Undergraduate Studies

This internship work is directly related to Object Orientated Programming which I have completed a long time ago. Furthermore this course is more closely related to Web Development course which I also completed. There are some parts from Database courses but lack of SQL due to the usage of software like Xampp does not relate to that course so much.

My programming interface is more closely related to MERN stack project which I had done during Web Development course as a final assignment to the course. The only difference is that, this language is more flexible and has a wide-range of features which cannot be mastered in a short time period. Both vue.js and node.js uses altered javascript with numerous build in features. Both use command line interfaces for easy installation and usage. Furthermore both uses git and other additional programs for richer experience.

Both vue.js and node.js uses altered javascript with numerous build in features. Both use command line interfaces for easy installation and usage. Furthermore both uses git and other additional programs for richer experience.

2.2 Related works

In my Object Orientated course, I had completed projects similar to this one on Java swing to create software based on café management. The program didn't have database but a binary file as data storage. Data CRUD operations are mainly done on using lists and arrays to build stacks or queues.

In my Web development project, I had completed a MERN stack software program as a final assignment to the course. The objective is to create an online e-mart. That program had mongodb as a database. Using express.js and mongoose build-in components for back-end operations and creating REST API for data CRUD operations are similar to my internship project work.

Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure

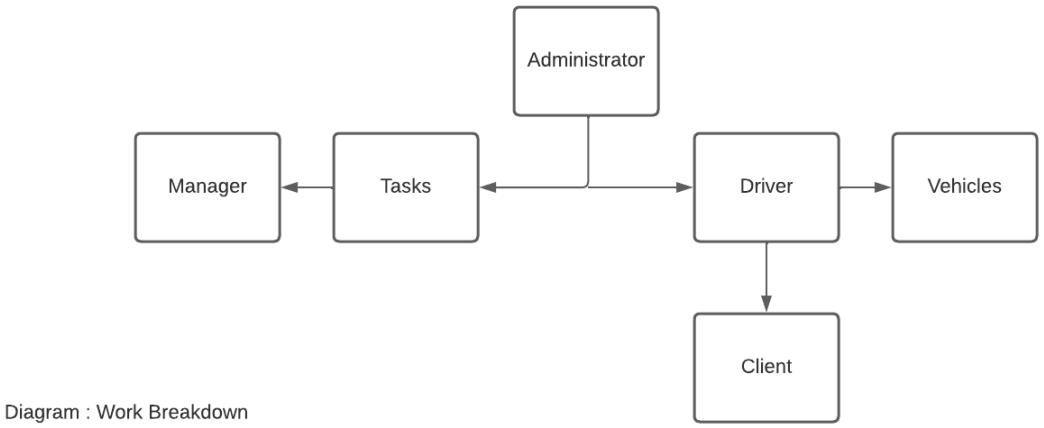


Diagram : Work Breakdown Structure of Transport Management System

Figure 3.1: Work Breakdown Structure

In the Work Breakdown Structure of the Transportation Management Software, the Administrator of the programming system handles almost all the tasks. Administrator creates delivery tasks to be given to Drivers of the Vehicles. Meanwhile, he also manages Vehicles. He can assign new vehicles, remove vehicles and change drivers if needed. He also manages the Drivers. He can recruit drivers to the organization and remove them if necessary.

On the other hand, Drivers who are assigned their tasks, travel to their designated area assigned by the administrator to deliver goods within deadline. Before the deadline they meet the client to unload their vehicles

3.2 Process/Activity wise Time Distribution

Activity	Predecessor	Estimated duration(days)
Admin adds a vehicle	none	3
Admin adds a driver	Admin adds a vehicle	2
Admin adds a task	Admin adds a driver	1
Vehicle driver takes a task	Admin adds a task	1
Driver sends a response for tak	Driver takes a task	2
Admin evaluates the complete task	Driver sends a response for task completion	1

Table 3.1: Activity wise Time Distribution Table

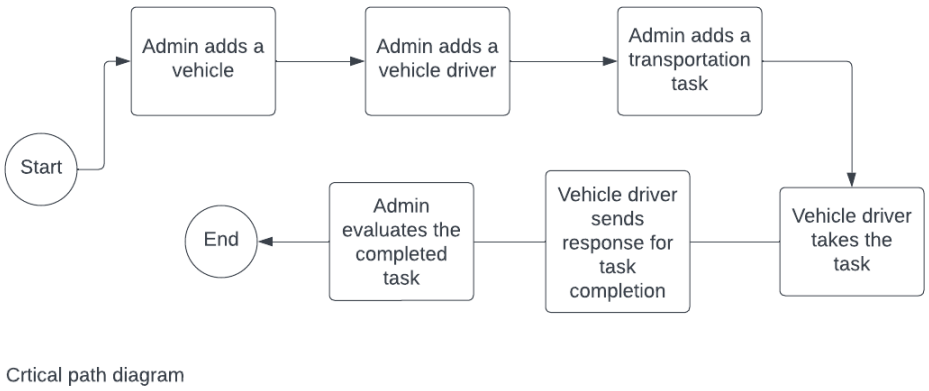


Figure 3.2: Critical Path Diagram

From the Activity Sequence table and Critical Path diagram we observe that all processes starts from when system administrator adds a vehicle to the system taking at an estimated 3 days. Next administrator adds a driver and allocates the driver employee to the required vehicle within 2 days. Then administrator creates a transportation task within a day which would be picked up by the vehicle driver. Next that vehicle driver sends a completion response to the system when the task is completed and that takes within 2 days. Finally the system administrator evaluates the completed transportation task and finishes the sequences of activity.

3.3 Gantt Chart

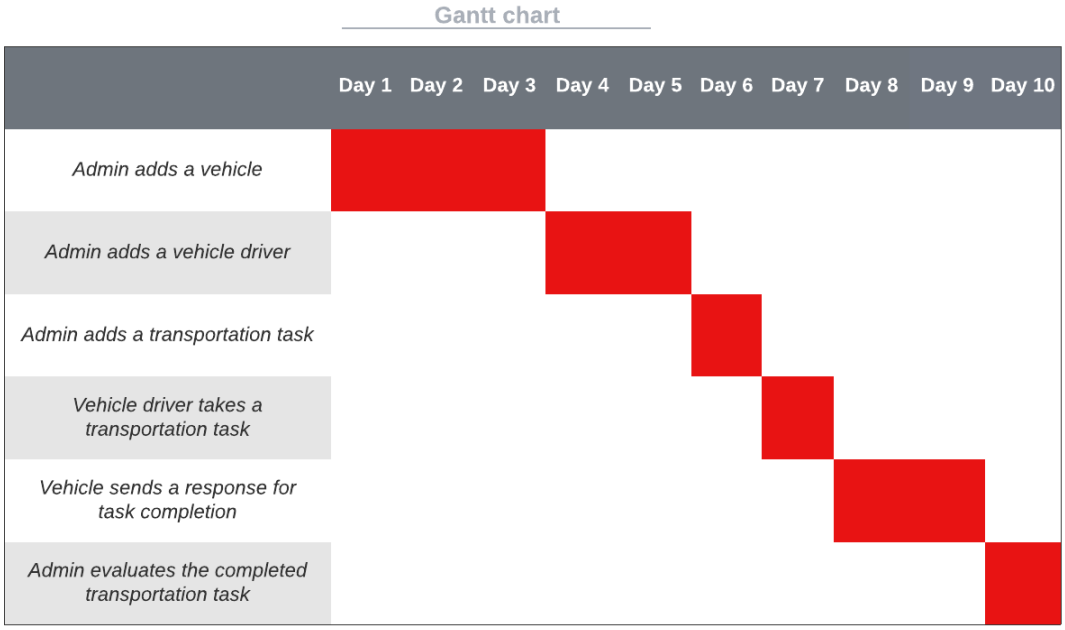


Figure 3.3: Gantt Chart

The Gantt chart above shows the days as columns and each activity on each row. The duration of each activity is represented by the color red. The activity of "Admin adds a vehicle" takes three days. The activity "Admin adds a vehicle driver" takes two days. The activity "Admin adds a transportation task" takes a day. The activity "Vehicle driver takes a transportation task" takes a day. Thenthe activity "Vehicle driver sends a response for task completion" takes two days. Finally the activity "Admin evaluates the completed transportation task takes a day".

3.4 Process/Activity wise Resource Allocation

Activity	Predecessor	Estimated duration(days)
Admin adds a vehicle	none	3
Admin adds a driver	Admin adds a vehicle	2
Admin adds a task	Admin adds a driver	1
Vehicle driver takes a task	Admin adds a task	1
Driver sends a response for tak	Driver takes a task	2
Admin evaluates the complete task	Driver sends a response for task completion	1

Table 3.2: Activity wise Resource Allocation Table

When the system administrator wants to add a vehicle in the system, the vehicle must be present. That means the required resources of purchase-cost, fuel cost, fuel-efficiency, safety features and license must be allocated and considered. When the system administrator wants to add a vehicle driver to the system, that means the organization hired an employee to drive the vehicle with the required resources of driver's salary, updated license card for vehicle driving and that driver's experience of driving in previous occasions before joining the organization. When the administrator adds a transportation task and when the driver takes the job, it only requires electricity and a device to run the system which can be smartphone browser or in desktop browser. When vehicle driver sends the confirm of task completion, that driver sends the resources that was spend which includes travelling fuel cost, driver's food cost and vehicle maintenance cost if required. Finally when the administrator reviews the completed task, the required resources include a device and electricity.

3.5 Estimated Costing

Activity	Predecessor	Estimated duration(days)
Admin adds a vehicle	none	3
Admin adds a driver	Admin adds a vehicle	2
Admin adds a task	Admin adds a driver	1
Vehicle driver takes a task	Admin adds a task	1
Driver sends a response for tak	Driver takes a task	2
Admin evaluates the complete task	Driver sends a response for task completion	1

Table 3.3: Estimated Cost

When the system administrator adds a vehicle, we are considering the estimated cost of a second-hand pic-up truck as the vehicle. That also includes the diesel cost currently at taka 109 per liter, vehicle fitness cost, registration name transfer cost, income tax as well as safety costs which includes new vehicle tires, vehicle glasses, perfect vehicle braking system and socket jumpers. When administrator adds a vehicle driver, we consider the monthly salary, driver's experience and renewal of driver's license card. Electricity bill per unit is taka 9.27 and in peak-hour which rises to taka 12.34 . As a consequence, I estimated that when administrator adds a task, reviews the completed task as well as when vehicle driver accepts the task, all costs are rounded to taka 5. Finally when the vehicle driver sends the task completion response, diesel fuel costs, food costs six times in two days and the optional vehicle maintenance cost for example new addition of tires as old tires are busted.

Chapter 4

Methodology

The internship project proposed from my instructor would use stack php laravel and vue.js following Software As A Service (SAAS) development model. The users of my software would access this application with multi-user architecture. That means multiple users would access the same pool of resources available in the software, same hosted environment and servers where users can store their specific data. The cloud-service providers can maintain and manage this application. There would be no overhead costs. It would have a subscription model with a time basis whose duration was not decided yet. This application can be accessed anywhere with a smart device and internet support which can give users a huge benefit if we consider mobilizing workforces efficiently. There is no specific installations, add-ons or plugins involved. People who would use this application does not need to do anything during updates, as even licenses would remain the same unless some critical changes needs to be taken care of. As a consequence there would be no issues with version control among users as everyone would use the same version of the application.

Chapter 5

Body of the Project

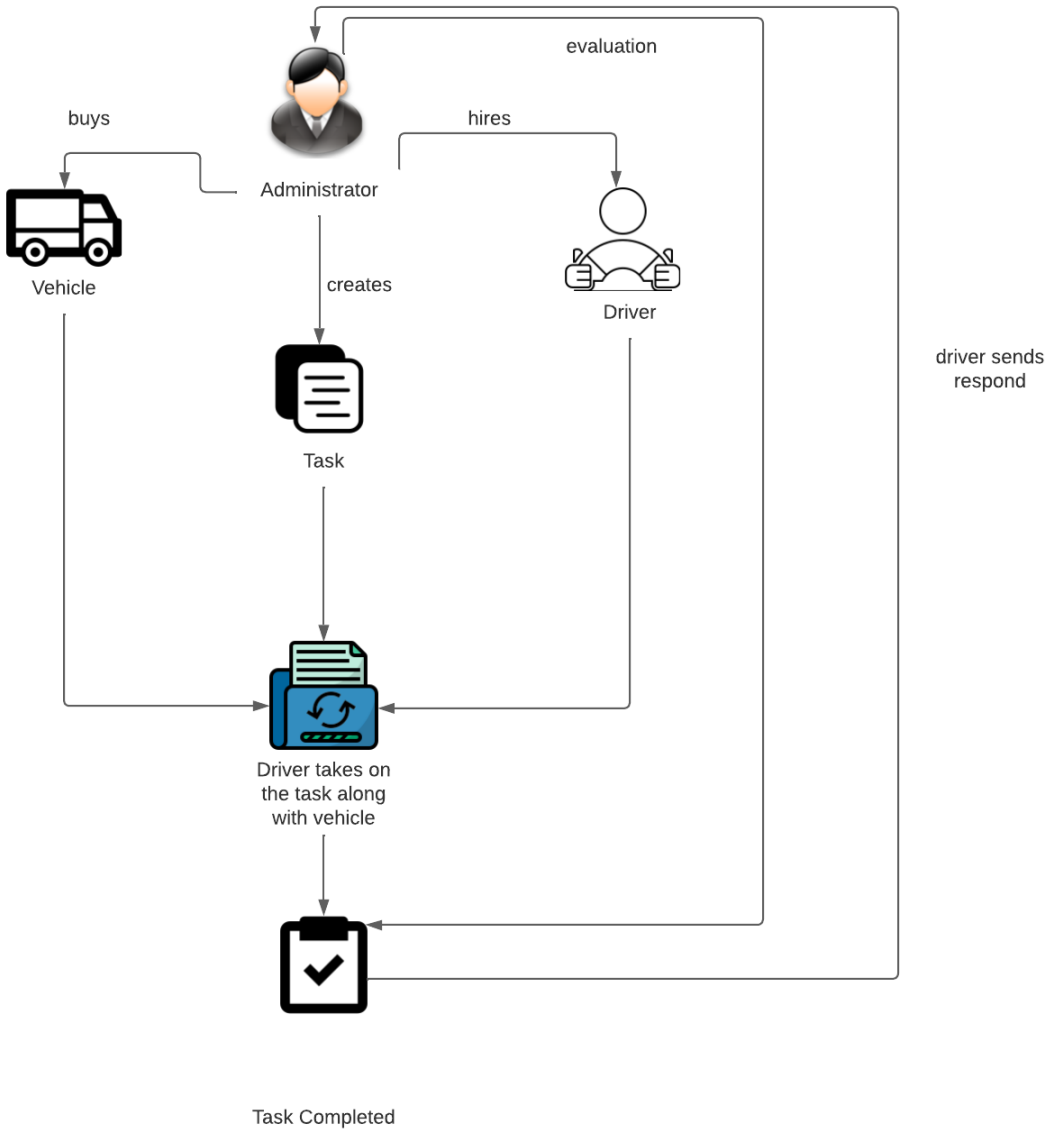
5.1 Work Description

At first I went to the website www.php.net where I downloaded and extract VS16 x64 Thread Safe (2023-Feb-14 10:31:00) on PHP 8.2 (8.2.3) for Windows version. Next I added environmental variables to run php. Next I went to the website https://www.apachefriends.org/ to install xampp. I went to the website https://nodejs.org/en/download/ to download node js. Next I downloaded composer from https://getcomposer.org/download/ . Finally I installed laravel(3) using the command: composer global require laravel/installer. After installing laravel I created a project using command: composer create project laravel/laravel backend, then I opened the server using command: php artisan serve, then in my browser I used the address http://127.0.0.1:8000 to open the laravel interface. To access mysql database from xampp, I opened browser tab using http://localhost/phpmyadmin/ where I created a database called $tms_database$. Furthermore I opened .env file in my laravel project directory and changed DB DATABASE=tms database. I created four models using command within the model directory of my laravel project: php artisan make:model modelName. Next I created the migration files for each model file within migration directory using command: php artisan make migration create myTableName table. Then I used command: use cmd: php artisan migrate so that database phpmyadmin get those tables. Finally I created controller files within the controllers folder using command: php artisan make controller name and corresponding routes in api.php file.

To install vue js, (4)used the command: npm install -g vue-cli and then creating the project using command: vue create frontend. Next within vue project directory, I installed router using command: vue add router and then installed axios using command npm install axios and vue-axios. Finaly I created components, views and routes to create my internship projec

5.2 Requirement Analysis

Rich Picture



(5)

Figure 5.1: Rich Diagram

Functional and Non-Functional Requirements

Functional requirements include that administrator can add a vehicle driver's information, update that information, delete that information as well as view that information. Administrator can add a vehicle's information, update that vehicle's information, delete that information as well as view that information. Administrator can also add another user as an administrator for the system, which as a consequence means viewing, editing, update and can delete that information. Finally administrator can get transportation jobs from clients, which were added

as tasks for the vehicle's driver. Vehicle drivers can login to the system by getting their login information from system administrator physically for security purposes.

Each employee of the organization can login and view only their information and specific jobs assigned to them. So, not all the tasks in the application can be viewed by the employee driver. After finishing their task, the vehicle driver would send a response to the administrator through the system. Administrator can evaluate that completed task. Note that there would be no task creation in the system by the administrator without the presence of any vehicle or its driver.

Non-functional requirements include adding the images of administrator, vehicle and vehicle-driver in the application as well as client's image to the application. That means administrator can also edit and update the images. The application would have laravel passport authorization on the back-end as well as vue.js authorization on the front-end for better security. The application would have real-time viewable tracker api which would give live updates of the jobs that each driver's would perform. That can be viewable on the application's dashboard. Furthermore the application would have use-friendly viewable data to be printed as document in the form of csv files, excels and pdf on the records of the completed tasks, vehicles and drivers.

5.3 System Analysis

5.3.1 Six Element Analysis

The internship project emerged from the problem of transport management is a complicated process where effective communication between the employees and manager is the key to run the organization. Transfer of important data from mouth to mouth or on paper takes time and includes more people to handle them. This makes the whole operation process slow and insecure. This increases overall cost in the organization leading to minimum profits. Clients to the organization would feel the services done to them were not up to the mark and would prefer someone who gave them better faster secure and friendly services. The prospect is to reduce people in the organization, reduce the transfer of data through lesser people and increase the speed of workload in the system. As aconsequence, it would secure the data transfer between clients to organization and between employees and manager. The organization would remain connected to its members increasing more cooperation and team work. That means more profit for the organization.

The application would keep all the data of the members of the organization who will use it. Data from past would be stored. Data would only transfer within the application, even important documents and decisions would be carried through the application. The manager of the organization would remain in-touch to the employees in real-time. Thus increases security within organization. Since data transfer would be carried out within the system, there is lesser complexity within the system. The organization would boost its profit due to lesser employees they have to hire. This application would be more applicable for larger organizations where there is large workforce.

5.3.2 Feasibility Analysis

The application does not have a better authorization security mechanism like laravel passport authorization as well as vue.js authorization. Each route needs to be secured and authorized. The application does not add images with data of vehicles, drivers and clients. Administrator cannot get a valid consistent response from the driver as an valid document as it would show every necessary proof required for a successful completion of the task, rather gets the link of where those documents are uploaded in the cloud storage. As a consequence, evaluation task of the administrator increases. The application cannot track where the driver is at any moment of time when the driver is continuing his job. This could mean risk factors regarding tasks are high and not secured. The application cannot make records of past job completion, past records of drivers, past records of assigned vehicles bought and sold by the organization. The application cannot create user-friendly documents of the past and current records of data in the organization

5.3.3 Problem Solution Analysis

There were lots of problems I faced during my work with the application that ranges from platform issues, backend program issues, frontend program issues as well as database issues. I worked through each of the problems and reached a solution. I took help from my organization supervisor as well as experienced people related to it. Some of the problems I faced was given in the table:

Problem	Cause	Solved
php startup error unable to load dynamic library'zip'	The file called php_zip.dll was not found	After going to C:\xampp\php and opening php.ini file, under Module settings I wrote: extension=php_zip.dll
Missing laravel vendor files	"~/.composer/ vendor/bin" directory is missing	In my windows system, I updated the environmental variable: set PATH=%path%;%dell%\AppData\Roaming\Composer\vendor\bin
VARCHAR limitation in laravel	Specified key too long	Since varchar has limitation of 255, I set my own length of string in the migration file
No-unused-vars error in vue.js	There unused variables in my program	In my package.json file, within the rules scope, I wrote: "no-unused-vars":"off"

Figure 5.2: Problem Solution Analysis

5.3.4 Effect and Constraints Analysis

The time required to make my application was too little as I was not experienced in laravel and vue.js. The time planning organized from my organization exceeds the time limit for my internship. The scheduling was more on practicing and executing what I learned. So the plan was to do more work in lesser time. There were less monitoring in my organization as everyone is busy. There is less communication most of the time. There were electricity shortages where I used to work and there were no back up electricity. My computer device is old and gets heated under long working stress. The original plan was to build an independent application but later on it was decided to be a part of another system as decided by my organization. There were lots of features that needed to be done in my application. That includes third-party api integration. There is also a need for better CSS build-up for my application with more user-friendly dashboard, header and footer in each route. That means more vue.js components are needed to be made.

5.4 System Design

UML Diagrams

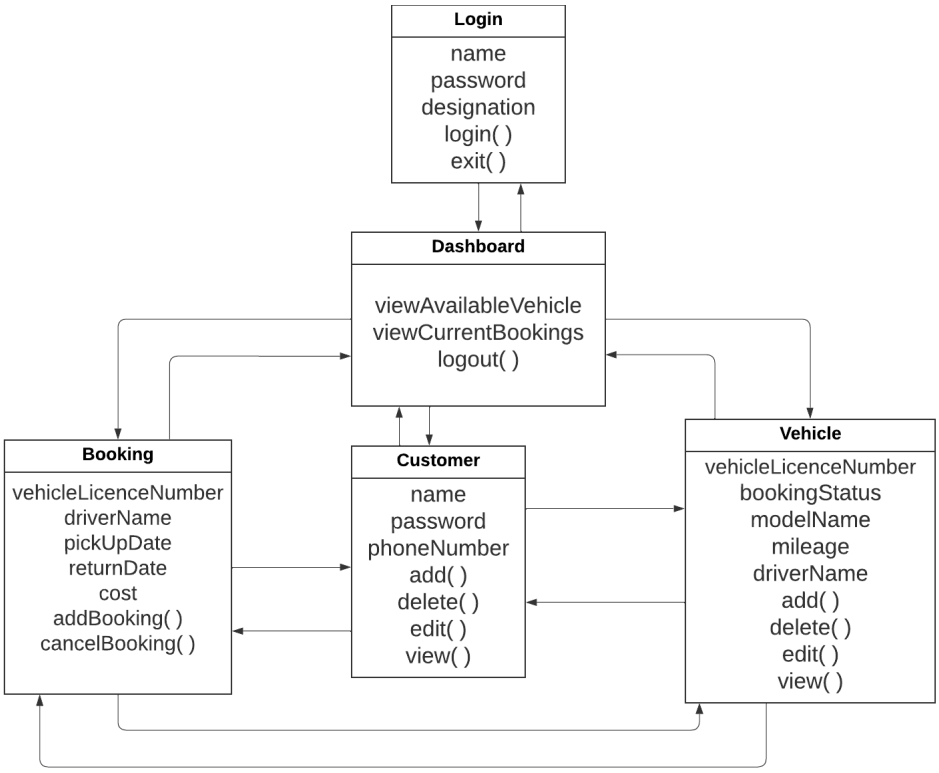


Figure 5.3: UML diagram

Architecture

The internship project is based on php version 8.2.0 (cli) that is built on 6th December 2022 at 15:31:23 with ZTS Visual C++ 2019 at x64, along with Zend Engine 4.2.0. The website where I downloaded the php zip file tagged the file as VS 16 x64 Thread Safe with time 2023-Feb-14 10:31:00.

The version of node.js in my system is tagged as v18.13.0 LTS. The version of the package manager for the node javascript version, npm is 8.19.3. The application has Laravel version 10 and Vue.js has the version 3.3.4. The current axios version according to package.json file is 1.1.2, the version of laravel-vite plugin is 0.7.5 and the version of vite is 4.0.0. The version of Xampp is 3.3.0 with the version of phpmyadmin 5.2.0.

5.5 Implementation

The internship project was implemented using Laravel installer version 4.4.1, psr version 2.0.2, symphony console version 6.2.5, the version of symphony deprecation contracts is 3.2.0, the version of symphony polyfill ctype is 1.27.0, the version of symphony polyfill intl grapheme is 1.27.0, the version of symphony polyfill intl normalizer is 1.27.0, the version of symphony polyfill mbstring is 1.27.0, the version of symphony process is 6.2.5, the version of symphony service contracts is 3.2.0 and the version of symphony string is 6.2.5. The Laravel application version is 10.13.2, the version of composer is 2.5.4, environment set is given to local, debug mode was enabled, the url is set to localhost and the maintenance mode is set to off. The cache configuration, event and routes are set to no-cached while cache-views was set to cached. On the drivers, broadcasting was set to log, cache was set to file, database was set to mysql, logs were set to both stack and single, mail was set to smtp, queue was set to sync and session was set to file.

The database server was set to server address 127.0.0.1 through TCP/IP. The server type is MariaDB. On server connection SSL was not used. The database server version is 10.4.27-MariaDB with protocol 10 and server charset set to UTF-8 Unicode (utf8mb4). The web server having Apache version at 2.4.54 with OpenSSL version 1.1.1p. The database client version is set to libmysql mysqlnd 8.2.0

The vue.js was implemented using babel and eslint with the version of vue cli is 5.0.8 with the version of babel-helper vue jsx merge props is 1.4.0, the version of babel helper vue transform-on is 1.0.2, the version for babel-plugin-jsx is 1.1.1, the version for babel-plugin-transform-vue jsx is 1.4.0, the version for babel preset-app is 5.0.8, the version for babel-preset-jsx is 1.4.0, the version for babel sugar composition-api inject h is 1.4.0, the version for babel sugar composition-api-render-instance is 1.4.0, the version for babel-sugar-functional vue is 1.4.0, the version for babel-sugar-inject-h is 1.4.0, the version for babel sugar-v-model is1.4.0, the version for babel-sugar-v-on is 1.4.0, the version for cli-overlay is 5.0.8, the version for cli-plugin-babel is 5.0.8, the version for cli plugin-eslint is 5.0.8, the version for cli-plugin-router is 5.0.8, the version for cli-plugin-vuex is 5.0.8, the version for cli-service is 5.0.8, the version for cli shared-utils is 5.0.8, the version for compiler-core is 3.3.4, the version for compiler-dom is 3.3.4, the version for

compiler-sfc is 3.3.4, the version for compiler-ssr is 3.3.4, the version for component-compiler-utils is 3.3.0, the version for reactivity is 3.3.4, the version for reactivity transform is 3.3.4, the version for runtime core is 3.3.4, the version for runtime dom is 3.3.4, the version for server renderer is 3.3.4, the version for shared is 3.3.4, the version for web-component-wrapper is 1.3.0, the version for eslint plugin vue is 8.7.1, the version for vue-eslint parser is 8.3.0, the version for vue hot reload api is 2.3.4, the version for vue loader is 17.2.2 (15.10.1), the version for vue-style loader is 4.1.3 and the version for vue template es2015 compiler is 1.9.1

5.6 Testing

Input

The application takes input for administrator information which includes administrator's id, administrator's name, administrator's password, administrator's mobile number, administrator's address and the branch name of the organization where administrator works. Database determines the administrator's id, entry creation date and last update date.

The application takes input for vehicle information which includes vehicle's id, vehicle's model, vehicle's license plate number, vehicle driver's name who currently assigned and vehicle's working status. Database determines the vehicle's id, entry creation date and last update date.

The application takes input for vehicle's driver which includes vehicle driver's id, vehicle driver's name, vehicle driver's password, vehicle driver's address and vehicle driver's mobile number. Database determines the vehicle driver's id, entry creation date and last update date.

The application takes input for task information which includes task's id, the license plate number of the vehicle that the task is assigned, the date which driver would start the task, the date where driver would end the task, the name of the customer who would be given the goods, the assigned place where the goods are loaded in the vehicle, the assigned place where the goods from the vehicle would be dropped and the working status of the task. Database determines the task's id, entry creation date and last update date.

Output

The application gives output for administrator information which are placed in the database for to view, edit and delete for the same administrator or other administrators including administrator's id, administrator's name, administrator's password in hashed form, administrator's mobile number, administrator's address and the branch name of the organization where administrator works.

Designing Test Cases

In order to design test cases, I tried to verify cases for login, adding data for an administrator, deleting data for an administrator, editing the administrator data, adding data for a vehicle, editing vehicle's data, deleting vehicle's data, adding data for a vehicle driver, editing vehicle

driver's data, deleting vehicle driver's data, adding data for a task, editing data for a task and deleting data for a task.

In all of the cases I was trying to interact with the database for data creation, data read, data update and data delete from back-end to front-end. I only used the Google chrome browser in my computer's windows operating system as localhost. In the initial parts of the test cases, major adjustments were needed to be made.

Test Results

The results shows for the cases of login, adding data for an administrator, deleting data for an administrator, editing the administrator data, adding data for a vehicle, editing vehicle's data, deleting vehicle's data, adding data for a vehicle driver, editing vehicle driver's data, deleting vehicle driver's data, adding data for a task, editing data for a task and deleting data for a task shows passing results. I already created the expected result scenarios for each action and found that every one of my cases shows positive passing results

Chapter 6

Results & Analysis

Test case name	Description	Procedures	Expected outcome	Result
login	On the login route, both administrator and vehicle driver need to use their email address and password	The specific email and password data for the administrator and vehicle driver was searched in the database.	If that exists for both email and password then allowed to login and change route to dashboard for respective administrator and vehicle driver	pass
Add an administrator	An administrator creating data for another in the application requires name, password, mobile number, email address and branch name	The specific data for the administrator was put in the input fields.	If the same data already exist in the database, it would not create a new administrator, if not then creates a new administrator in the database. This can viewed both in the application and database	pass

Figure 6.1: Result and Analysis

Add an administrator	An administrator creating data for another in the application requires name, password, mobile number, email address and branch name.	The specific data for the administrator was put in the input fields.	If the same data already exist in the database, it would not create a new administrator, if not then creates a new administrator in the database. This can viewed both in the application and database	pass
Editing administrator's data	An administrator can edit the data of self or another administrator's data.	The specific data for the administrator to be edited was selected from the data table. While clicking the edit button, input fields would view the data to be edited.	If the data in the input fields remain the same after saving, it would show no editing done. If data is changed, it would show message that data has updated.	pass

Deleting administrator's data	An administrator can delete the data of self or another administrator's data.	The specific data for the administrator to be deleted was selected from the data table. Then clicking the delete button.	If the data was deleted it would disappear from the view table and database. There would a message for delete successfully. If not then message would show failed.	pass

Adding data for a vehicle	An administrator creating data for a vehicle in the application requires data for model, license plate number, current assigned driver name and vehicle working status.	The specific data for the vehicle was put in the input fields.	If the same data already exist in the database, it would not create a new vehicle, if not then creates a new vehicle in the database. This can viewed both in the application and database	pass
Editing data for vehicle	An administrator can edit the data of a vehicle in the application.	The specific data for the vehicle to be edited was selected from the data table. While clicking the edit button, input fields would view the data to be edited.	If the data in the input fields remain the same after saving, it would show no editing done. If data is changed, it would show message that data has updated.	pass
Deleting a vehicle data	An administrator can delete the data of a vehicle in the application.	The specific data for the vehicle to be deleted was selected from the data table. Then clicking the delete button would delete it.	If the data was deleted it would disappear from the view table and database. There would a message for delete successfully. If not then message would show failed.	pass

Adding data for a vehicle driver	An administrator creating data for a vehicle driver in the application requires data name, password, email address and mobile number	The specific data for the vehicle driver was put in the input fields	If the same data already exist in the database, it would not create a new vehicle driver, if not then creates a new vehicle driver in the database. This can viewed both in the application and database.	pass
Editing a vehicle driver's data	An administrator can edit the data of a vehicle driver in the application.	The specific data for the vehicle driver to be edited was selected from the data table. While clicking the edit button, input fields would view the data to be edited.	If the data in the input fields remain the same after saving, it would show no editing done. If data is changed, it would show message that data has updated.	pass
Deleting a vehicle driver's data	An administrator can delete the data of a vehicle driver in the application.	The specific data for the vehicle driver to be deleted was selected from the data table. Then clicking the delete button would delete it.	If the data was deleted it would disappear from the view table and database. There would a message for delete successfully. If not then message would show failed.	pass

Adding data for a task	An administrator creating data for a task in the application requires data for vehicle's license plate number assigned to the task, date for starting the task, date for task deadline, customer name, place to load goods in vehicle, place for delivery of goods and task's working status.	The specific data for the task was put in the input fields	If the same data already exist in the database, it would not create a new task, if not then creates a new task in the database. This can viewed both in the application and database.	pass
Editing task information	An administrator can edit the data of a task in the application.	The specific data for the task to be edited was selected from the data table. While clicking the edit button, input fields would view the data to be edited.	If the data in the input fields remain the same after saving, it would show no editing done. If data is changed, it would show message that data has updated.	pass

Deleting a task info from database	An administrator can delete the data of a task in the application.	The specific data for the task to be deleted was selected from the data table. Then clicking the delete button would delete it.	If the data was deleted it would disappear from the view table and database. There would a message for delete successfully. If not then message would show failed	pass

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project/Work

A Transport Management System application used by an organization can have the capabilities to have effective communication between every member of the hierarchy in the organization. With high data speed, they can track view each other, collect and transfer information with fast efficiency, higher security and completely expels repeated tasks that are otherwise very necessary when without using this application. Customers can easily communicate with the organization and use the application from anywhere with user-friendly features that can be used with the simple click of a button.

A Transport Management System used by a multiple enterprise businesses can extend not only to their organization but to each customer's own backyard. They can use it to monitor each customer's needs, sends proper response for that need and get an overall data of the whole region. Thus that multi-business organization can get famous within the region. They can extend their business activities to other fields and can use the application in other ways from their original goals

A Transport Management System reduces excess work load in the organization. The organization can expel extra employees. It creates simpler lesser operating activities for the organization. Employees can do more team work activities which would boost the overall activities in the organization. This eliminates lazy workers in the organization, workers doing things other in their work time by keeping them all under constant tracking in real-time. This not only saves time but adds more security in the organization.

7.2 Social and Environmental Effects and Analysis

The usage of Transport Management System would have smart road routing capabilities choosing the most optimum road for the transport of the vehicle. This reduces extra fuel cost, lesser driving work and reduces environmental pollution. The vehicle driver would be happy as

he gets to driver doing the same work with lesser working effort. The customer would be happy as that customer gets services quickly from the organization as they use this application other than those who don't use them.

The usage of Transport Management System for a period of time by an organization can have positive social effects. The past data collection by the organization ensures who wants what in any particular place. They can even pre-ship goods with that data so that customers can get their hands on those goods faster than ever before. The society as a whole can have faster movement of goods and commodities thus local economy is benefitted. That also means a country as a whole is benefitted when we consider using this application across the country.

7.3 Addressing Ethics and Ethical Issues

The usage of Transport Management System in an organization means use of data and transfer of data. With that comes private data of each employee which needed to be secured and should be handled by each employee carefully. There would be data that may involve the organization's transaction, business deals, decisions, sensitive communications and many more. Each employee should handle their devices having the application carefully. So that outsiders doesn't any hands on it and they don't lose it unconsciously. Each device should be secured to prevent theft and hacking.

The usage of Transport Management System in an organization means that each employee is being constantly monitored in real-time. This could cause privacy concerns for that employee. So there should be a regulation for each employee, when and where they should be monitored or not. It should also be noted that tracking is done for security purposes of the organization. This ethical issue must be mentioned when a new employee is hired.

The Transport Management System should work the same for all routes with same optimization algorithm techniques and same real time tracking techniques. Some employee may feel that the application acting biased towards them by choosing longer road routes or different tracking mechanisms. Therefore it is the duty of the organization to have a tutorial course on the usage of this application during hiring employees so that each employee should not feel any sort of biasness towards the application.

Chapter 8

Lesson Learned

8.1 Problems Faced During this Period

There were lots of problems during my internship at Flyte Solutions. First of all there were electricity shortages which prevent me to do any sort of work in the organization. This is the same case at my home as well. The topic was lengthy with little time. I am completely new during the starting period in my company. I needed to learn how to communicate with other members in the organizations which I lack heavily. The topic of my project involves Laravel and Vue.js which were completely new to me at that time. When travelling to my organization from my home Siddheswari to Flyte Solutions at Gulshan 1, there were always traffic jams wasting a lot of time. There were times in the organization where I had to do all sort of works for my seniors, which were completely not related to my intern work at all so wasting my time and effort. I faced lots of installation problems for php, laravel and vue.js due to Windows operating system issues, code bug problems as well as my hardware overheating problems.

8.2 Solution of those Problems

The solutions of the problems that I faced during my internship were limited to none when considering anything outside programming works. I cannot do anything when electricity shortages occur as it is related to national issues. Only thing I could do this work through when electricity is present. The internship topic was lengthy with the required time, so I had to allocate time routine-wise to tackle this issue systematically. I learned a little bit of communication in the organization as my seniors and my supervisor helped me whenever they can. I learned from the basics of Laravel and Vue.js through my organization as well as watching tutorial videos on the internet as well as their documentations found from the official website. Due to my hardware issues, I would always shut down my device for a short time periodically and do my works. I always look at the official documents for bug fix but most of the time I had to look at places websites like stackoverflow or youtube.

Chapter 9

Future Work & Conclusion

9.1 Future Works

I want to extend my internship project as per planned from my internship supervisor at Flyte Solutions. Though I learned Laravel and Vue.js, it is still not on the level of a professional programmer. I want to do updates on my current project by adding tracking api, mobile phone connection and more user-friendly interface. I wanted to do more works relating Laravel and Vue.js as well as relating them with artificial intelligence if possible.

9.2 Conclusion

It has been a great opportunity work in Flyte Solutions LTD with supervisor Sir Saiful Shumon to work in a Software company and do a project based on Laravel and Vue.js which are considered very popular programming languages. The internship topic Transportation Management System is a highly needed application in the developed world which is spreading popularity in our country.

It has been a great pleasure to take an internship course in my university Independent University Bangladesh under supervisor Md Shakhawat Hossain, PhD.

This internship is a great opportunity to work in a professional environment. I believe I improved my programming skills, knowledge and team work to work in an organization. I gained great perception in Laravel and Vue.js. This gain I would like to take in my future endeavor as well to build bigger and better projects.

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An Undergraduate Internship on Transport Management System as a Backend Developer

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Summer, 2024

The student modified the internship final report as per the recommendation made by his or her academic supervisor and/or panel members during final viva, and the department can use this version for achieving.

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