MINISTRY OF EDUCATION AND TRAINING

FPT UNIVERSITY

Capstone Project Document

Build a Web-based application that manages the activities of delivery service system by coach

Group 18	
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Supervisor	Nguyễn Trọng Tài
Ext Supervisor	N/A
Capstone Project Code	i-Deliver

- Hồ Chí Minh City, May 2014 -

Acknowledgement

To write these words for expressing our gratitude, we first say thanks to Mr. Nguyen Trong Tai about his help for all of us for more than three months duration. He always willing to answer our questions, guide to solve the problems not only at the two meeting days each week but also whenever we need him. We believe that each of time our team faced to difficulties gave caused of his concern. We also appreciate to his kindness and his trust to choose our team among two teams applied to the same his project at the beginning of the course.

After a long time of learning in FPT University, we have been taught by a lot of lectures. Each of them has a specific style but all give us the chances to gain the huge of precious knowledge for the future works and we will not forget their work. End of this duration, capstone project is really a milestone for our study journey. We all believe this is one of best subject we have learned and we also would like to say thanks to education departure of FU for set this subject with the real importance meanings and effects.

When receive the decision of forming our team, each member of our team do not know the others and we have not worked together in any project before that. It is quite hard at some first weeks for sharing the issues within team members. But after that, with the same objectives, we found out the solidarity spirit and everything became better. No doubts that our team not very good and we need to try day by day to finish our tasks for build the website for the release day.

In these days, we also receive the assistance from our friends and the encouragement from our family. Without these help, we may not get anything done and we have to say thanks to all of them as a duty.

And we also say thanks to Mr. Kieu Trong Khanh about his accept to the invitation to take part in our trial defense capstone project and gave us a lot of comments for improving our project. Our project may be contains some bugs but we do not afraid to find and fix them because this should be the main of software engineering daily work.

Group 18
Đào Bảo Long,

Lê Phúc Lữ,

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Terminology

No.	Terminology	Explanation
1.	Customer	A person who needs to request for goods delivery from their province to another province.
2.	Staff	A person in charge of managing delivery requests and related services of journeys.
3.	System Administrator	A person take responsibilities of manage staff and price changes
4.	Delivery Request	A request sent by a customer to the staff to ask for a delivery request with the i-Deliver system

1. Introduction

1.1. Introduction

Project Title:	*Building a web-based application that manages the activities of delivery service system by coach*			
Start Date:	Jan 6, 2014		**Finished Date:**	
No	**Full name**	**Role**	**Position**	**Contact**
1.	Nguyễn Trọng Tài	Supervisor	Lecturer	TaiNT@fpt.edu.vn
2.	Đào Bảo Long	Developer, Tester	Team Leader	LongDBSE60690@fpt.edu.vn
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5.	Nguyễn Tấn Đức	Developer, Tester	Member	DucNTSE60660@fpt.edu.vn

1.2. The initial idea of group

Nowadays, freight traffic between cities in a day is huge. We have the passenger transportation service providers like Mai Linh or the goods delivery service providers like Tin Thanh, Hop Nhat. And we also have the combination like Phuong Trang. Before working on this project, our team conducted a survey in a passenger transportation service provider. Here are the major findings during the survey:

Phuong Trang Travel & Transportation Company:

This company provides passenger transport service using coach. Beside this service, this company also provides goods delivery service. They receive a lot delivery requests per day but all of them still managed by staff manually using papers/books. It makes planning and scheduling for goods delivery become complicated beside passenger transportation arrangement, also makes hard to manage all goods to ensure integrity.

From the problems above, our team decided to develop a delivery service system for passenger transportation service providers which using coach. It operates difference from professional delivery service which using cars specially made for goods delivery.

1.3. Overview of existing methods

1.1.1. Requests management

The goods delivery service's staffs have to write down all of delivery requests, monitoring – planning – scheduling manually using papers/books and their memory.

1.1.2. Packages arrangement

They just simply fill-up empty cargo compartments of each coach as much as possible.

1.1.3. Packages management

Tracking, searching … is temporary unavailable

1.4. Limitations of existing system

1.1.1. Requests management

By using papers/books and memory, staffs cannot ensure information accuracy; controllable requests, delivery status of requests.

1.1.2. Packages management and arrangement

They don't have any specific fee calculating formula, it's just estimation.

They don't have any plan to arrange package on each coach so it's hard to balance the freight on each route.

1.1.3. Schedules and trips management

They don't have detail plans to schedule for each trip, all still managed by demands on real-time.

1.5. Benefits of expected system

The project aims to develop a web-based application that

- Create an easy way for customers to make goods delivery request by allow them to post a new requests on website with registered account then they can tracking their package to ensure delivery.
- Mainly assists service providers' staff to manage all goods delivery request by using optimized planning and scheduling algorithms, manage the fee of the delivery requests
- Allow customers to comment and rating for the service.

1.6. Business outline

Following the project objectives above, the scope of the project is constrained to the following statements:

- The users of the web-application should interact with the web-application itself through a friendly and attractive user interface.
- *For **customers***, this web-application should provide fundamental functions such as register, login then post, edit and cancel goods delivery requests. Through integrated e-payment services, they can pay for their delivery requests. They also can search for posted requested, tracking their package. After using service, customers can comment and rating for the service.
- *For **system administrators***, the web-application should allow them to monitor fundamental information about customers, staffs, coaches, routes, and fee.
- *For **staffs**,* i-Deliver is a management system allows them to import request, fee calculating, invoice making, planning and scheduling for goods delivery, assign packages for specific coach, specific route.

1.7. Approaches

- Adopt the perspective of a customer during the whole development process, in order to develop a web-based application that promotes usability and interactivity as much as possible.
- Negotiate with web service providers to use their services, and then agree upon how the application communicates with the web services, what information should be retained and what should be eliminated.
- Try to provide staffs the customized tools for manage requests easily.
- Conduct research on how to determine the most appropriate fee based on the average fee of the same service providers in the market.
- Conduct research on how to optimize planning and scheduling for goods delivery.

1.8. Group of functions

Functions for customers	▫ Allow customers register, login, post/edit/cancel requests, search for, and tracking requests; ▫ Allow customers to rate by different criteria and write comments/reviews on service;
Functions for staffs	▫ Allow staffs to manage fundamental information about requests, fee calculating, invoice making; ▫ Allow staffs to planning and scheduling for goods delivery; ▫ Allow staffs to monitoring and assigning for coaches and routes;
Functions for system admins	▫ Allow system admins to manage all relevant information about the system, customers, staffs, coaches and routes; ▫ Allow system admins to grant access rights to other users of the system; ▫ Allow system admins to decide fee calculating formulas; ▫ Allow system admins to collect and export data to statistic.

2. Software Project Management Plan (SPMP)

2.1. Problem Definition

2.1.1. Name of this Capstone Project

Official name	Building a web-based application that manages the activities of delivery service system by coach
Vietnamese name	Xây dựng ứng dụng web quản lý các hoạt động cho dịch vụ vận chuyển hàng hóa thông qua hệ thống xe khách đường dài
Abbreviation	i-Deliver

2.1.2. Problem Abstract

The idea of the project is to develop a web-based application that assists delivery service staffs/administrators in manages goods delivery requests, package arrangement, and planning and scheduling, fee management. It also helps customers to make goods delivery request, searching and tracking their package, make a payment online.

2.1.3. Project Overview

2.2.3.1. The Current System

The idea of this project is developing a delivery service system for passenger transportation service providers which using coach. Before working on this project, we conducted a survey about traditional goods delivery process.

Traditional goods delivery process:

Customers will pick their package to delivery service station and provide the name of receiver, destination, and type of goods, weight and size. Then staffs of delivery service will calculate transport fee and give the customer a package invoice which contain provided information and destination station address.

2.2.3.2. The Proposed System

By working on this project, we will develop a service system that assists delivery services providers in Ho Chi Minh City to be closer to their customers. The system has some significant features:

Create user-oriented interfaces for administrators to simplify management:

The i-Deliver system support administrators to manage delivery fee like define or edit fee factor. It also helps them to manage related activities of a journey, included trips, stages, stations and routes. Of course the system will provide mechanisms to manage users/staffs.

Support staffs in delivery requests management, package arrangement, planning and scheduling:

This system provide easy-to-use interface for requests management like make a new request, edit request information, fee calculating, invoice making, packages arrangement and planning and scheduling, assign packages for specific coach/route.

Easy-to-use tool for customer to make goods delivery requests, searching and review/edit requests, tracking their package:

The i-Deliver system is integrated with some technique to help making goods delivery requests online, searching then review or edit requests information, tracking customer's packages by using request code.

Optimize arrangement, planning and scheduling for package delivery process

In traditional way, delivery service staffs have to planning, scheduling and arrange packages for each coaches manually. They just simply fill-up empty cargo compartments as much as possible. This system helps them do their works easily, efficiently by using tools, which optimized by arrangement, planning and scheduling algorithms.

The i-Deliver system's users:

1. **Guests**: non-authorized members can register new account of the i-Deliver website to be granted full access permission or they just can search for routes which delivery service providers operating.
2. **Members:** guests had an authorized account can login to the i-Deliver website to
    - Make goods delivery requests;
    - Search for posted requests;
    - Edit posted requests;
    - Cancel posted requests (also have constraints);
    - Tracking packages;
    - Comment and rating for service;
    - Statistics
3. **Administrators**: owners of the i-Deliver website who have highest permission can
    - Create new staff account;
    - Edit staff account information;
    - Delete staff account;
    - Define fee calculating formula and fixed value;
    - Edit fee calculating formula and fixed value;
    - Statistics
4. **Staffs**: users who has account which created by administrators have right to
    - Manage requests: approve, reject, update status, assign and scheduling;
    - Search for packages, routes or members;
    - Manage journeys: include add new, edit or delete routes, stations, trips and coaches;
    - Manage comments and rates: delete violated/spam comments

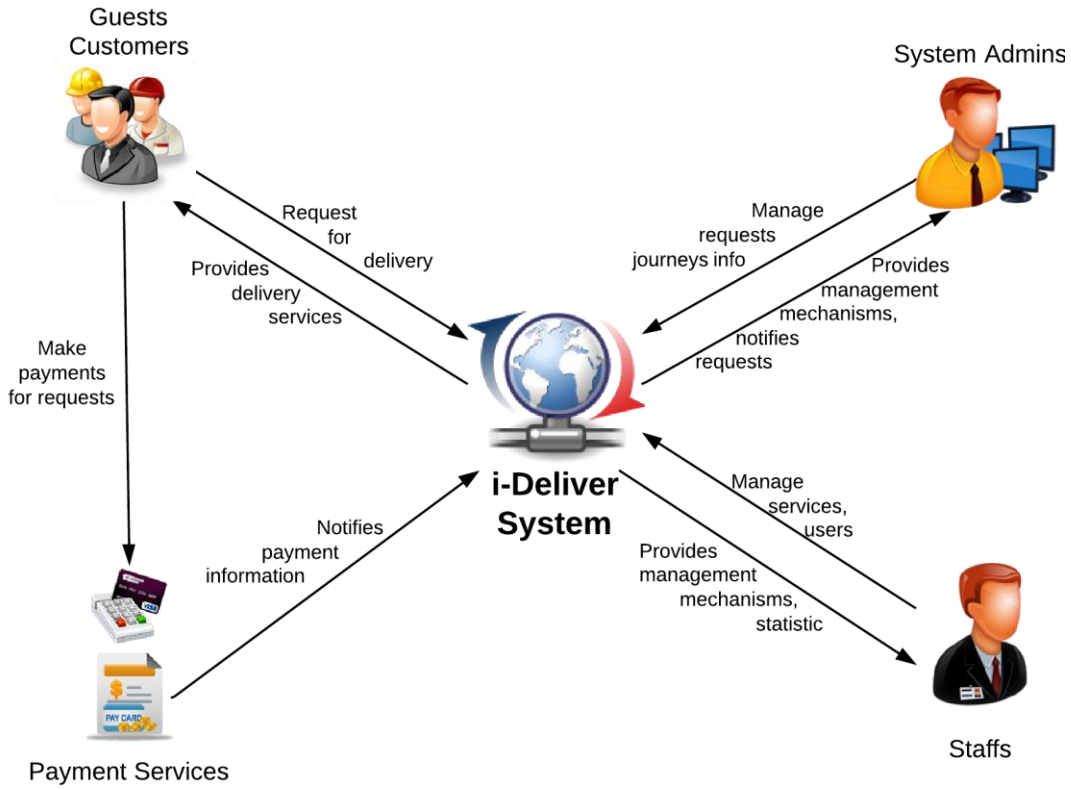


Figure 1. An overview of the i-Deliver system

2.2.3.3. Boundaries of the System

There is no previous version of this system. The product will be developed from scratch, independent of any current system.

As said previously, the system under development is not a delivery service management system. It does not provide mechanisms to manage all activities related to goods delivery. In our team's scope, the i-Deliver is a system that manage related activities of transportation service providers which using coaches. It means that the service provider only working on 2-stations routes (likes Saigon-Nha Trang, Saigon-Vung Tau, Saigon-Hanoi); they don't provide mechanism to deliver packages to stations between starting point and destination. That is our team's future plan for this system.

It focuses mainly on providing easy-to-use interfaces and tools, which support both customers and delivery service staffs.

The final product of this Capstone Project includes

- A service portal which helps customers make goods delivery requests;
- A management module for staffs/administrators of delivery service;
- All the documents involved in the development process.

2.2.3.4. Development Environment

Below is the list of hardware and software requirements needed for the development environment of the project.

Hardware requirements

- Personal computers for developing with the minimum configuration: 2 Gb of RAM, 100GB of hard disk, Core 2 Duo 2.0 Ghz;
- A server computer for testing with the minimum configuration: 4 Gb of RAM, 100GB of hard disk, Core 2 Duo 2.0 Ghz;
- All computers must be connected to the Internet.

Software requirements

- Operating system: Windows 7 or above;
- Web Server: IIS Express 8;
- Framework: .NET Framework 4.5;
- IDE: Visual Studio 2012;
- DBMS: SQL Server 2008 R2;
- Source Control: Tortoise SVN 1.8.4.

2.2. Project organization

2.3.1. Software Process Model

The waterfall software lifecycle model will be used to guide the development of the system. The waterfall model includes five major phases as in the figure below, enforcing moving to the next phase only after completion of the previous phase.

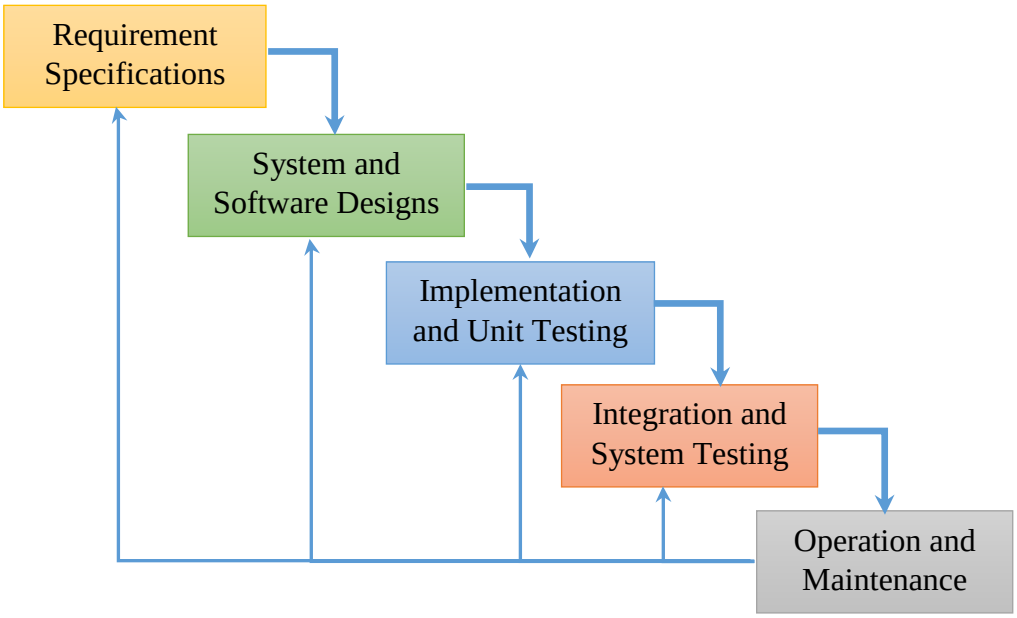


Figure 2. The waterfall software lifecycle model

2.3.2. Roles and Responsibilities

No	Full name	Role in group	Responsibilities
1	Nguyễn Trọng Tài	Supervisor	▫ Give advice on business and technical problems; ▫ Review and approve of project documents and product deliverables; ▫ Assess the performance of team members.

2	Đào Bảo Long	Team Leader, Developer, Tester	▫ Create project management plan and distribute tasks to the other members; ▫ Monitor the development process and review the deliverables; ▫ Work on system architecture and detailed designs; ▫ Implement; ▫ Prepare documents; ▫ Perform unit testing; ▫ Deploy the final product.
3	Lê Phúc Lữ	Developer, Tester	▫ Research on; ▫ Design user interfaces; ▫ Work on detailed designs; ▫ Implement; ▫ Prepare documents; ▫ Perform unit testing, system testing, and integration test.
4	Nguyễn Thanh Tùng	Developer, Tester	▫ Research on; ▫ Design user interfaces; ▫ Work on detailed designs; ▫ Implement; ▫ Perform unit testing, system testing, and integration test.
5	Nguyễn Tấn Đức	Developer, Tester	▫ Research on; ▫ Design user interfaces; ▫ Work on detailed designs; ▫ Implement; ▫ Perform unit testing, system testing, and integration test.

2.3.3. Tools and Techniques

The tools that will be used to develop the system include:

- *Developing tools:* Microsoft Visual Studio 2012; Tortoise SVN 1.8.4; Microsoft SQL Server 2008 RC;
- *Modeling tools:* StarUML 5.0.2.1570;
- *Document tools:* Microsoft Office 2010.

2.3. Project management plan

2.4.1. Tasks

Below are all the major tasks that need to be performed sequentially during the development of the system.

2.2.1.1. Task 1: Initiating

Task name	Initiating
Descriptions	Perform research/survey on some delivery service providers and pricing model; decide upon the technology that will be used to develop the system.
Deliverables	Report 1 – Project Introduction
Resources needed	All team members; 6 days
Dependencies and constraints	N/A
Risks	Performing survey on the delivery service providers can be difficult because of their business; the chosen technology is new to some members.

2.2.1.2. Task 2: Planning

Task name	Planning
Descriptions	Create the project management plan; break the system into modules and assign tasks to each member.
Deliverables	Report 2 – Software Project Management Plan
Resources needed	All team members; 6 days
Dependencies and constraints	Task 1 has finished
Risks	Team leader has no experience in managing software projects; all members are still not acquainted with the new technology.

2.2.1.3. Task 3: Specifying requirements

Task name	Specifying requirements
Descriptions	Discuss and agree upon the software requirements, what is to be developed and what is not; generate detailed descriptions of all the functions to be developed.
Deliverables	Report 3 – Software Requirement Specification
Resources needed	All team members; 15 days
Dependencies and constraints	Task 2 has finished
Risks	Many aspects of the problem are still unclear to team members; has no experience of working in a delivery service management project.

2.2.1.4. Task 4: Designing database

Task name	Designing database
Descriptions	Design the database based on the requirements collected, through three major steps: Conceptual, Logical, and

	Physical Design
Deliverables	ERD and the physical database with sample data
Resources needed	All team members; 3 days
Dependencies and constraints	Task 3 has finished
Risks	Some of the requirements specified are not clear and cannot be translated into corresponding entities; little experience in organizing data.

2.2.1.5. **Task 5: Creating Software Design Description**

Task name	Creating Software Design Description
Descriptions	Agree upon the system architecture; work on the detailed design of each module; decide which techniques are appropriate to which modules; design the user interfaces for users to interact with.
Deliverables	Report 4 – Software Design Description
Resources needed	All team members; 12 days
Dependencies and constraints	Task 4 has finished
Risks	Some functions are difficult to find appropriate methods to implement; initial development environment setup is also difficult.

2.2.1.6. **Task 6: Implementing**

Task name	Implementing
Descriptions	Each team member implement all the functions that he or she was assigned and regularly check in the code to the Tortoise SVN; regularly validate that the implementation is consistent with the system and detailed designs.
Deliverables	The implemented website
Resources needed	All team members; 24 days
Dependencies and constraints	Task 5 has finished
Risks	Some design documents contain errors; implementation is not always consistent with the system and detailed designs.

2.2.1.7. **Task 7: Performing Testing**

Task name	Performing Unit Testing
Descriptions	Create and perform appropriate test cases for all main functions; record the test results for later reference; fix all the bugs found during the testing sessions.
Deliverables	Report 5 – Software Test Documentation

Resources needed	All team members; 12 days
Dependencies and constraints	Task 6 has finished
Risks	Lack of test cases for some non-critical functions; not enough time to intensively test all the functions.

2.2.1.8. Task 8: Writing User's Manual

Task name	Writing User's Manual
Descriptions	Writing a user's manual to instruct the users, including guest, users, staffs, and system administrators, how to use the system.
Deliverables	Report 6 – User's Manual
Resources needed	All team members; 5 days
Dependencies and constraints	Task 7 has finished
Risks	Some of the functions are not consistent with the user requirements, causing the user's manual to be inconsistent with the user requirements.

2.2.1.9. Task 9: Deploying the Website

Task name	Deploying the Website
Descriptions	Perform acceptance testing and deploy the website to a host on the Internet
Deliverables	The complete website
Resources needed	All team members; all days left
Dependencies and constraints	Task 8 has finished
Risks	Little experience of deploying a website to a real host

2.2.1.10. Task 10: Finalizing and Closing

Task name	Finalizing and Closing
Descriptions	Finalize all related documents and prepare for presentation
Deliverables	The complete website and related documents, presentation
Resources needed	All team members; 4 days
Dependencies and constraints	Task 9 has finished

2.4.2. Task sheet

Refer to the next page for the detailed task sheet of the project plan.

Task Name	Length	Start	Finish	Predec
1. Initiating	**6 days**	**Mon 06/01/14**	**Sat 11/01/14**	
1.1. Identify key stakeholders	1 day	Mon 06/01/14	Mon 06/01/14	
1.2. Research & discuss about business and technology	2 days	Tue 07/01/14	Wed 08/01/14	1.
1.3. Research on similar existing system	2 days	Thu 09/01/14	Fri 10/01/14	
1.4. Hold project kick-off meeting	0.5 days	Sat 11/01/14	Sat 11/01/14	1.2,
1.5. Report 1 – Project Introduction	0.5 days	Sat 11/01/14	Sat 11/01/14	1.
2. Planning	**6 days**	**Mon 13/01/14**	**Mon 20/01/14**	
2.1. Hold team planning meeting	0.5 days	Mon 13/01/14	Mon 13/01/14	1.
2.2. Prepare problem abstract, proposed solution, coding convention	2 days	Mon 13/01/14	Wed 15/01/14	2.
2.3. Prepare major tasks for the whole team	1.5 days	Wed 15/01/14	Thu 16/01/14	2.
2.4. Prepare management plan and determine task resources, durations, and dependencies	2 days	Wed 15/01/14	Thu 16/01/14	2.
2.5. Configure Tortoise SVN	0.5 days	Mon 20/01/14	Mon 20/01/14	2.
2.6. Report 2 – Project Management Plan	1.5 days	Fri 17/01/14	Mon 20/01/14	2.1-
3. Specifying requirements	**15 days**	**Mon 20/01/14**	**Fri 07/02/14**	
3.1. Identify users and users' requirements	3 days	Mon 20/01/14	Thu 23/01/14	2.
3.2. Define system requirements	1 day	Thu 23/01/14	Fri 24/01/14	3.
3.3. Define non-functional requirements	1 day	Thu 23/01/14	Fri 24/01/14	3.
3.4. Determine main flows	3 days	Thu 23/01/14	Tue 28/01/14	3.
3.5. Specify functional requirements for users/customers (requests making, searching and reviews posted requests)	3 days	Tue 28/01/14	Fri 31/01/14	
3.6. Specify functional requirements for staffs (requests management, package arrangement and scheduling)	3 days	Tue 28/01/14	Fri 31/01/14	
3.7. Specify functional requirements for administrators	3 days	Tue 28/01/14	Fri 31/01/14	
3.8. Specify functional requirements for coaches, trips, stages, stations, routes management, pricing model, fee calculating	3 days	Tue 28/01/14	Fri 31/01/14	
3.9. Specify functional requirements for statistics	2 days	Fri 31/01/14	Tue 04/02/14	
3.10. Report 3 – Software Requirement	2 days	Wed 05/02/14	Fri 07/02/14	3.1-

Specification				
4. Designing database	**3 days**	**Fri 07/02/14**	**Tue 11/02/14**	
4.1. Discuss on conceptual data model	0.5 days	Fri 07/02/14	Fri 07/02/14	3.1
4.2. Creating ERD	0.5 days	Fri 07/02/14	Fri 07/02/14	4.
4.3. Validate ERD against software requirements	1 day	Mon 10/02/14	Mon 10/02/14	4.
4.4. Create logical model and physical database	1 day	Tue 11/02/14	Tue 11/02/14	4.
5. Creating Software Design Description	**12 days**	**Wed 12/02/14**	**Thu 27/02/14**	
5.1. Discuss on system architecture	0.5 days	Wed 12/02/14	Wed 12/02/14	3.1
5.2. Configure development environment	0.5 days	Wed 12/02/14	Wed 12/02/14	
5.3. Design the master page	1.5 days	Wed 12/02/14	Thu 13/02/14	3.1
5.4. Design the master customer layout	2.5 days	Wed 12/02/14	Fri 14/02/14	3.1
5.5. Design the master staff layout	2.5 days	Wed 12/02/14	Fri 14/02/14	
5.6. Design the master admin layout	1.5 days	Wed 12/02/14	Thu 13/02/14	
5.7. Design pages for log in, log out, register of customer	1 day	Fri 14/02/14	Fri 14/02/14	
5.8. Design pages for posting new request, edit request, view request	2 days	Mon 17/02/14	Tue 18/02/14	
5.9. Design pages for customer to view and edit profile	1.5 days	Mon 17/02/14	Tue 18/02/14	
5.10. Design page for admin manage fee, stage, route, staff.	2.5 days	Mon 17/02/14	Wed 19/02/14	
5.11. Design page for staff manage trip, request and invoice.	2.5 days	Wed 19/02/14	Fri 21/02/14	
5.12. Design page for staff statistic request and trip information.	1.5 days	Tue 18/02/14	Wed 19/02/14	
5.13. Design page for staff schedule the package delivery time.	1 day	Wed 19/02/14	Wed 19/02/14	
5.14. Design layout for user rate and post comment of routes	1 day	Mon 24/02/14	Mon 24/02/14	
5.15. Design page for tracking the package	1 day	Mon 24/02/14	Mon 24/02/14	
5.16. Design page for admin manage comment, rating	1 day	Thu 20/02/14	Thu 20/02/14	
5.17. Design page for user statistic their request information	0.5 days	Thu 20/02/14	Thu 20/02/14	
5.18. Create main sequence diagrams of view, search, edit and delete request	1.5 days	Thu 20/02/14	Fri 21/02/14	
5.19. Create main sequence diagrams of manage comment, rating, fee, stage, route, and staff	1.5 days	Mon 24/02/14	Tue 25/02/14	
5.20. Create main sequence diagrams of	0.5 days	Tue 25/02/14	Tue 25/02/14	

posting and rating a route				
5.21. Create main sequence diagrams of assigning package, edit status of request and manage time (departure/arrival) of coach.	1 day	Tue 25/02/14	Tue 25/02/14	
5.22. Draw entity class diagram	0.5 days	Tue 25/02/14	Tue 25/02/14	
5.23. Draw model class diagram	0.5 days	Tue 25/02/14	Tue 25/02/14	
5.24. Compose physical database description	1 day	Wed 26/02/14	Wed 26/02/14	
5.25. Report 4 – Software Design Description	1 day	Thu 27/02/14	Thu 27/02/14	
6. Implementing	**24 days**	**Fri 28/02/14**	**Wed 02/04/14**	
6.1. Log in, log out, register	1 day	Fri 28/02/14	Fri 28/02/14	5.
6.2. Search and view routes	1 day	Fri 28/02/14	Fri 28/02/14	5.
6.3. Post and view request	1.5 days	Fri 28/02/14	Mon 03/03/14	5.
6.4. Search, edit, delete request	1.5 days	Mon 03/03/14	Tue 04/03/14	5.
6.5. Rating for route	1 day	Fri 28/02/14	Fri 28/02/14	5.
6.6. Comment for route	1 day	Mon 03/03/14	Mon 03/03/14	5.
6.7. Tracking package	3 days	Mon 03/03/14	Wed 05/03/14	5.
6.8. Manage all coach and relative information	4 days	Mon 03/03/14	Thu 06/03/14	5.
6.9. Manage all user and relative information	4 days	Wed 05/03/14	Mon 10/03/14	5.
6.10. Manage all rating of user	2 days	Tue 04/03/14	Wed 05/03/14	5.1
6.11. Manage all comment user	2 days	Thu 06/03/14	Fri 07/03/14	5.1
6.12. Manage fee of service	2 days	Mon 10/03/14	Tue 11/03/14	5.1
6.13. Statistics of users	2 days	Thu 06/03/14	Fri 07/03/14	
6.14. Statistics of staffs	2 days	Mon 10/03/14	Tue 11/03/14	
6.15. Statistics of administrators	2 days	Mon 10/03/14	Tue 11/03/14	
6.16. Manage all trips	3 days	Tue 11/03/14	Thu 13/03/14	
6.17. Manage package	2 days	Wed 12/03/14	Thu 13/03/14	
6.18. Scheduling for package	3 days	Wed 12/03/14	Fri 14/03/14	
6.19. Integrate all implemented functions	13 days	Mon 17/03/14	Wed 02/04/14	
7. Performing Testing	**12 days**	**Thu 03/04/14**	**Fri 18/04/14**	
7.1. Write appropriate unit test cases for the functions each member implemented	3 days	Thu 03/04/14	Mon 07/04/14	6.1
7.2. Perform unit testing and record the results	2 days	Tue 08/04/14	Wed 09/04/14	7.

7.3. Fix the bugs discovered during unit testing	3 days	Thu 10/04/14	Mon 14/04/14	7.
7.4. Complete code review checklists	1 day	Tue 15/04/14	Tue 15/04/14	7.
7.5. Report 5 – Software Test Documentation	1 day	Wed 16/04/14	Wed 16/04/14	7.
7.6. Perform integration test and fix the bugs discovered	2 days	Thu 17/04/14	Fri 18/04/14	7.
8. Writing Users' Manual	**5 days**	**Mon 21/04/14**	**Fri 25/04/14**	
8.1. Write users' manual for all the functions that each member implemented	3.5 days	Mon 21/04/14	Thu 24/04/14	7.
8.2. Check if the users' manual and software requirements are consistent	1.5 days	Thu 24/04/14	Fri 25/04/14	8.
9. Deploying the Website	**6 days**	**Sat 26/04/14**	**Fri 02/05/14**	
9.1. Add more data to the database	2 days	Sat 26/04/14	Mon 28/04/14	
9.2. Deploy the website the a real host	0.5 days	Tue 29/04/14	Tue 29/04/14	7.
9.3. Test the website on the real host	3.5 days	Tue 29/04/14	Fri 02/05/14	
10. Finalizing and closing	**4 days**	**Mon 05/05/14**	**Thu 08/05/14**	
10.1. Prepare final project report	3 days	Mon 05/05/14	Wed 07/05/14	
10.2. Prepare final project presentation	2 days	Mon 05/05/14	Tue 06/05/14	
10.3. Final team meeting	1 day	Thu 08/05/14	Thu 08/05/14	
10.4. Close the project	0 days	Thu 08/05/14	Thu 08/05/14	

3. Software Requirement Specifications (SRS)

3.1. User Requirement Specification

The system should allow 4 types of actors, namely Guest, Customer, Staff, and System Administrator, and an abstract actor named Logged User, to interact with. Each of these types of user is granted a set of functions as specified below.

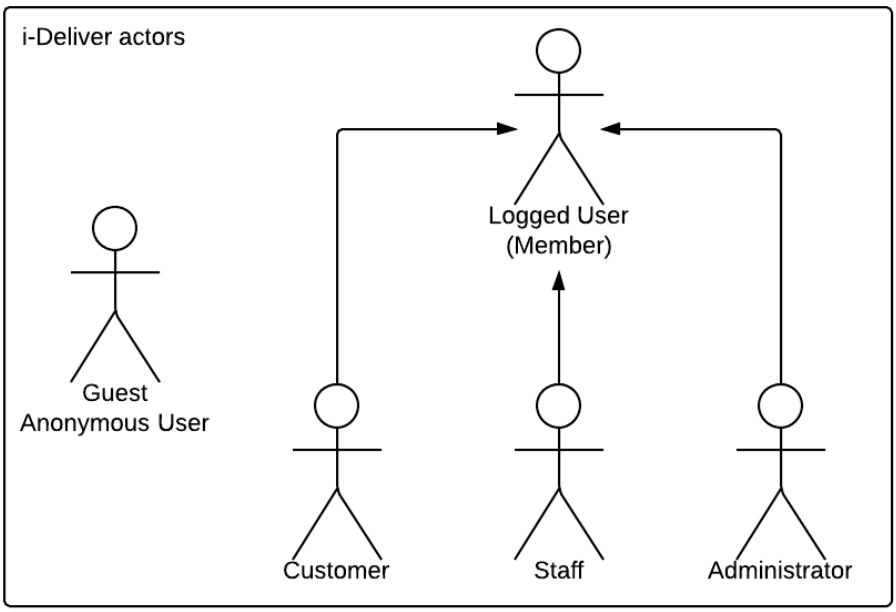


Diagram 1. Actor overview diagram

3.1.1. Guest Requirements

A guest is an unauthenticated user of the website. He or she can:

- Log in with his authorized account;
- Register a new account;
- View, search for, and filter routes by a number of criteria that suit his or her needs;
- View details of an arbitrary routes.

3.1.2. Logged User Requirements

A logged user is an authenticated user of the website (e.g., a user who logged on to the system with a valid username and password). They can:

- Log out;
- Change their own password;
- View and update their account details.

Note that that this actor is an abstract one and does not represent a real actor in practice.

3.1.3. Customer Requirements

A Customer is a logged user (see 3.1.2. Logged User Requirement) and is given all the functions of a logged user. In addition, he or she is granted all the functions of a guest (see 3.1.1. Guest Requirement) except for the Log in and Register functions. A Customer also has his or her own set of functions:

- Create and submit the goods delivery requests;
- Cancel unwanted requests if they weren't paid or approved;
- Edit submitted delivery information in a limit duration;

- Leave reviews and rate for the service of a station;
- Tracking for package (when the package left station, time left to be delivered, …);
- Make an online payment via third-party service.

3.1.4. System Admin Requirements

A System Administrator is a logged user (see 3.1.2. Logged User Requirement) and is given all the functions of a logged user. In addition, a system Administrator also has his or her own set of functions:

- Manage Staff accounts;
- Add more System Administrator accounts;
- Manage fee value and calculating formula;
- Statistics: get data about revenue, performance.

3.1.5. Staff Requirements

A Staff is a logged user (see 3.1.2. Logged User Requirement) and is given all the functions of a logged user. In addition, a system Administrator also has his or her own set of functions:

- Manage all requests: approve, reject online requests, create new, edit and cancel offline requests;
- Manage all related information about routes, stations, trips and coaches;
- Arrange and schedule for packages delivery;
- Searching for information about requests, routes, stations, trips and coaches;
- Manage comments and rating: delete violated comments and clear spam rating;

3.2. System Requirement Specification (Specific Requirements)

3.2.1. Overall use case

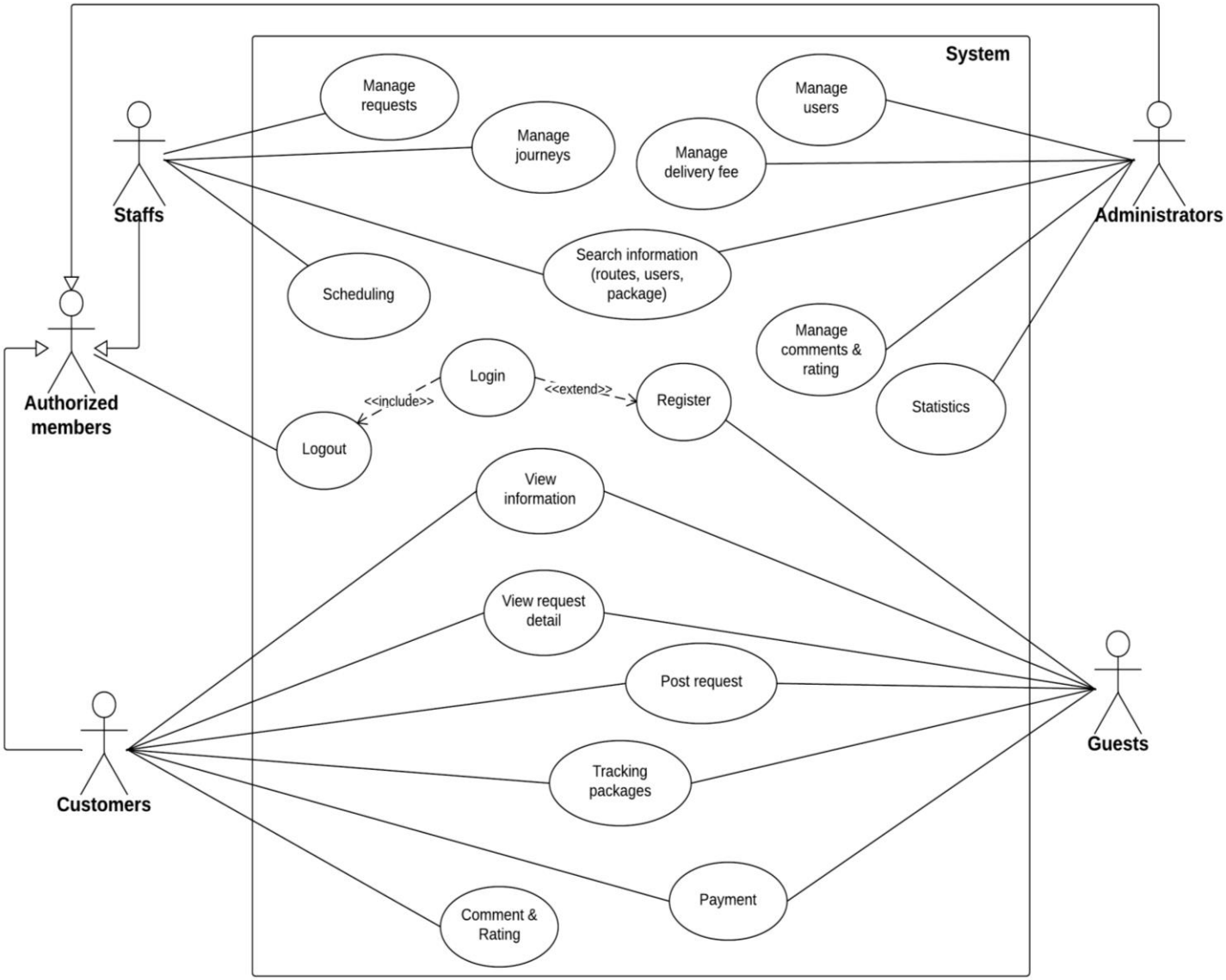


Figure 3. Overall use case

3.3. Entity Relationship Diagram

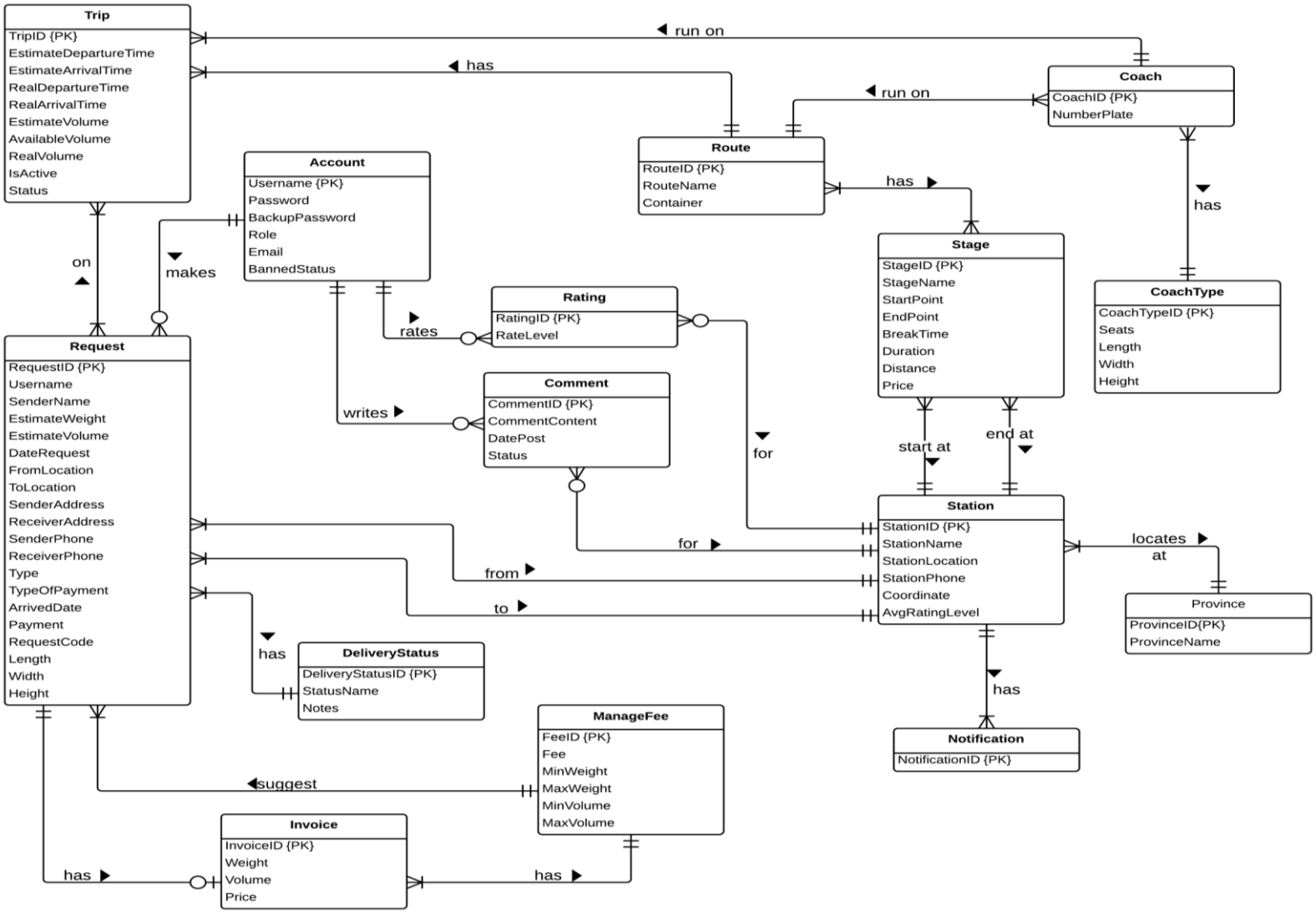


Diagram 2. Entity relationship diagram

4. Software Design Description (SDD)

4.1. Design Overview

The SDD describes the system architectural design and the detailed designs, including the user interfaces, of the system.

The components should communicate through interfaces. The detailed implementation of each component should be transparent to other components. The passive MVC III pattern is the preferable architecture for the website.

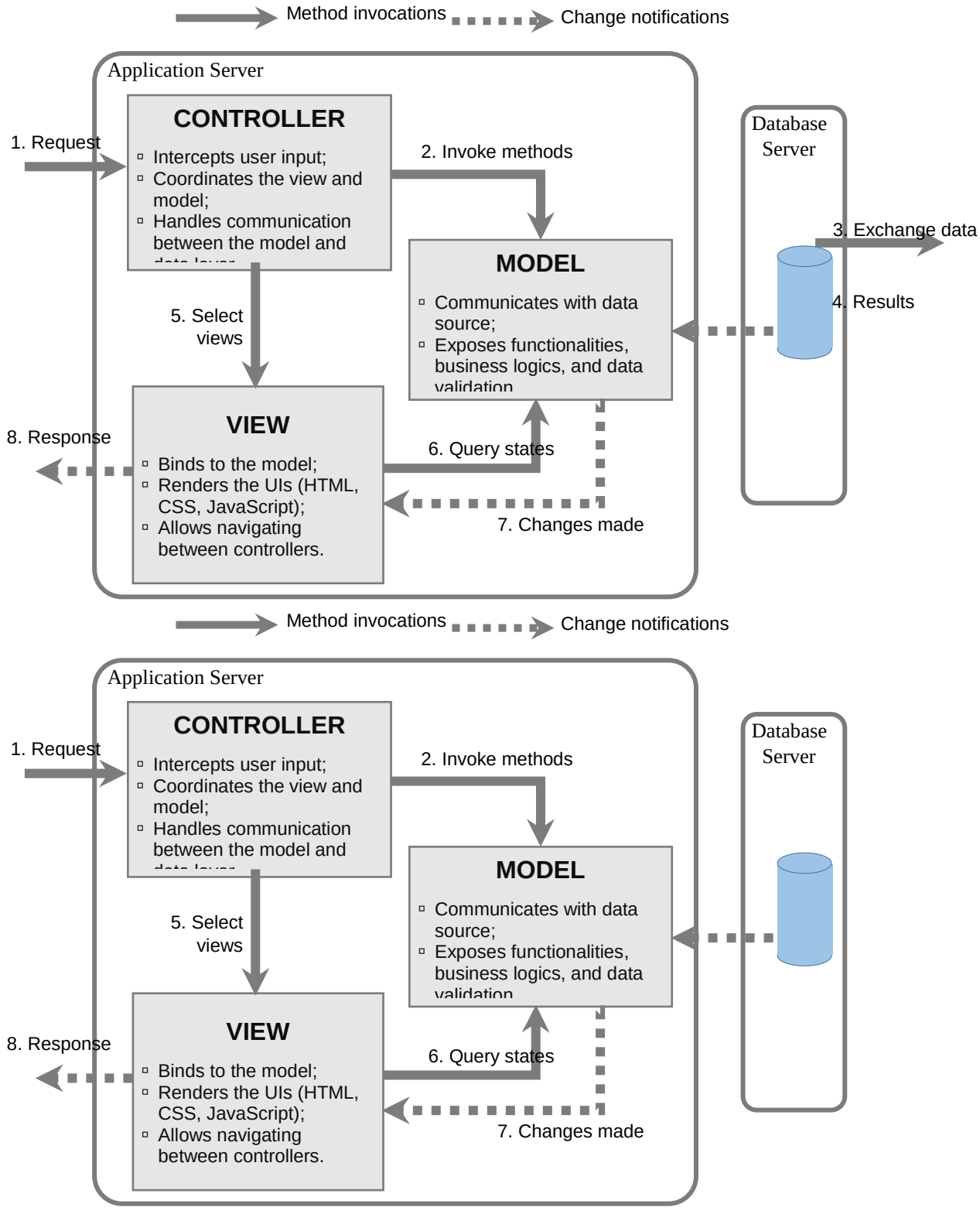
The detailed designs of the system should adopt the basic principles of software design, including “high cohesion, low coupling” and “open to extension, closed to modification” principles.

Each of the following sections is summarized below:

- Section 4.2: Gives a specification of the system architecture design, describing the overall architecture of the system and subsystems.
- Section 4.3: Specifies all the components that should be included in the system, and the communications between them.
- Section 4.4: Describes the class and package diagrams, as well as their descriptions in details, to provide a static view of the system.
- Section 4.4: Describes the sequence diagrams for the use cases specified in the SRS, to provide a dynamic view of the system.
- Section 4.5: Describes the user interfaces, to specify what will be seen by the users of the system.
- Section 4.5: Describes the Database Design, including the relations and the relationships between them.

4.2. System Architectural Design

The MVC III (Model – View – Controller) pattern is used as the overall system architecture, because it specifies a clear distinction between the responsibilities of the components and is appropriate for developing web applications.


Method invocations
Change notifications
Application Server
CONTROLLER
Intercepts user input;
Coordinates the view and model;
Handles communication between the model and
1. Request
2. Invoke methods
MODEL
Communicates with data source;
Exposes functionalities, business logics, and data validation
Database Server
3. Exchange data
4. Results
5. Select views
VIEW
Binds to the model;
Renders the UIs (HTML, CSS, JavaScript);
Allows navigating between controllers.
8. Response
6. Query states
7. Changes made
Method invocations
Change notifications
Application Server
CONTROLLER
Intercepts user input;
Coordinates the view and model;
Handles communication between the model and
1. Request
2. Invoke methods
MODEL
Communicates with data source;
Exposes functionalities, business logics, and data validation
Database Server
5. Select views
VIEW
Binds to the model;
Renders the UIs (HTML, CSS, JavaScript);
Allows navigating between controllers.
8. Response
6. Query states
7. Changes made

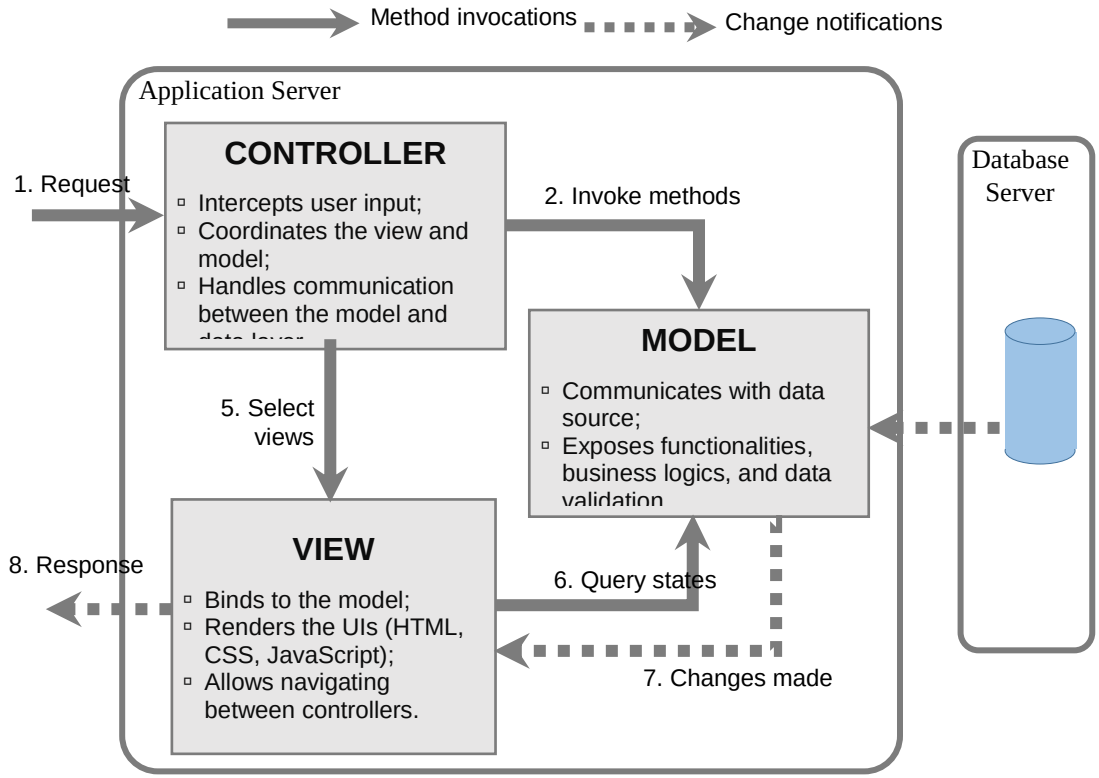


Figure 4. Model-View-Controller Architecture

4.3. Component Diagram

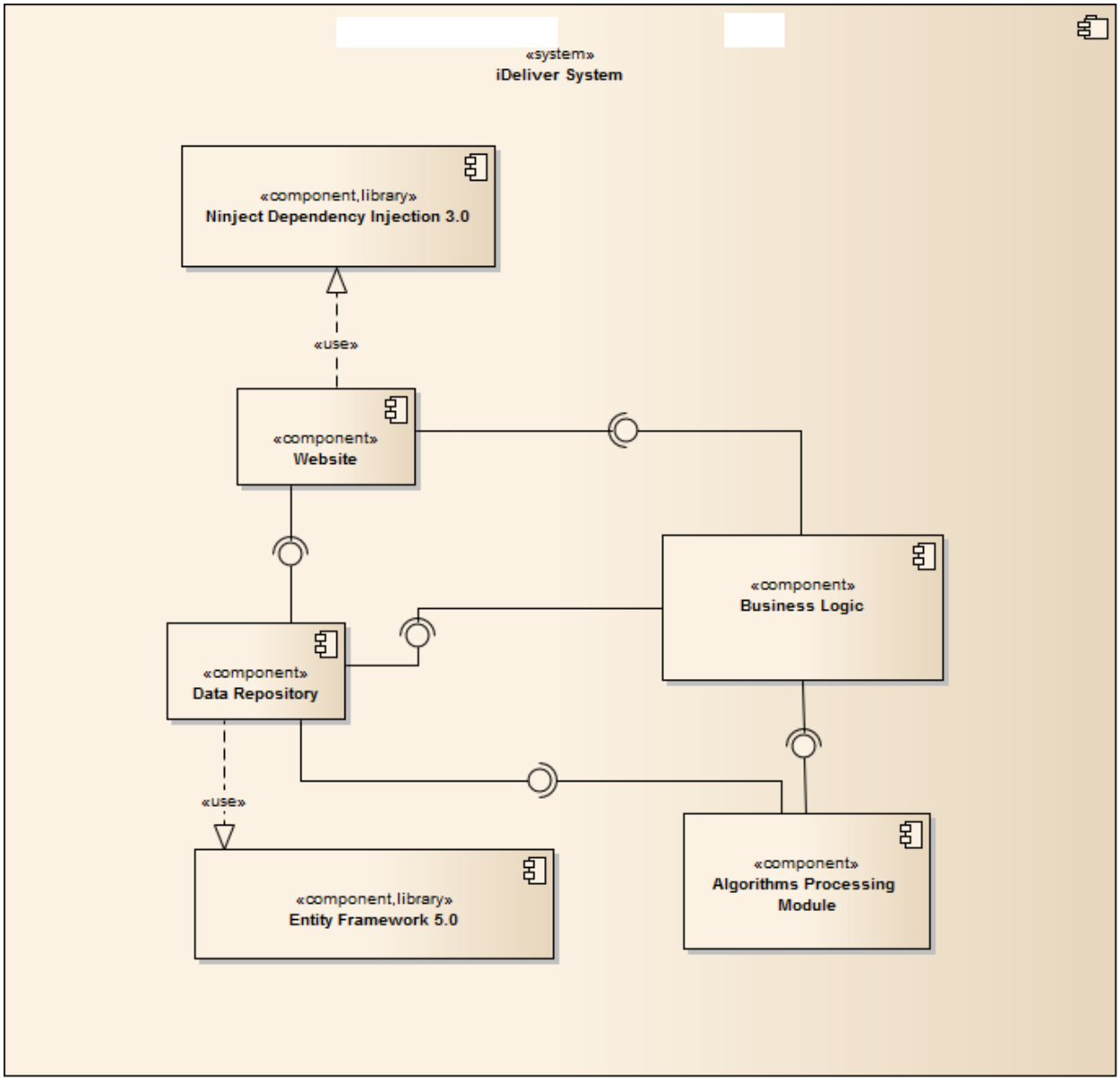


Diagram 3. Component Diagram

The i-Deliver system includes the following major components:

- **Entity Framework 5.0:** An object-relational mapper that enables working with relational data persistence using domain-specific objects;
- **Data Repository:** A data store that provides data access functionality, using the Entity Framework to communicates with the database;
- **Business Logic:** A module that uses interfaces exposed by the Data Repository to encapsulate important businesses of in the i-Deliver system;
- **Ninject Dependency Injection 3.0:** A lightweight dependency injection framework for .NET applications which helps split the application into a collection of loosely-coupled, highly-cohesive pieces, and then glue them back together in a flexible manner.
- **Website:** A web-application that helps exposes all the functionalities to end-users.

- **Algorithms Processing Module:** A module that uses Interface and DataRepository to execute the business of system by processing through some relative entities and find out the needed connections between them that satisfying the given constraint.

From the point of view of the MVC-III pattern, the components Entity Framework 5.0, Data Repository, Business Logic, and Ninject Dependency Injection 3.0 all belong to the Model part. The Controller and the View parts are wrapped in the component Website.

4.4. Database Design

3.2.2. Logical database design

From the ERD specified in the SRS section, logical database design includes the following relations:

Index	Table Name	Description
1	Account	List of user that registered to the system with valid username and password.
2	UserInfo	Detail information of each user.
3	Coach	List of all coach the center has.
4	CoachType	List of type of coach base on the number of seat that the coach has.
5	Route	List of route that center can deliver to, including the route name.
6	Trip	Information of trip of each coach the center has every day.
7	Station	The list of all stations the center has.
8	Schedule	The schedule of coach for run on the specific route during a day.
9	Request	Information of each request that user posted to the system.
10	DeliveryStatus	Status of the request of base on the action of user and staff.
11	Invoice	Detail of invoice corresponding to the approve request.
12	ManageFee	The fee of service base on the range of volume and range of weight.
13	Comment	Content of comment of user posted for each station.
14	Rating	Rating level that user rate for each station.
15	Assigning	Table of mapping between coach and request.
16	Stage	The partial of the way of route, each stage contains the start and end station and addition information of this stage.
17	RouteStage	Mapping between route and stage
18	Notification	Check whether user has seen the notification or not yet.
19	Province	List of provinces that the system has some station in there.

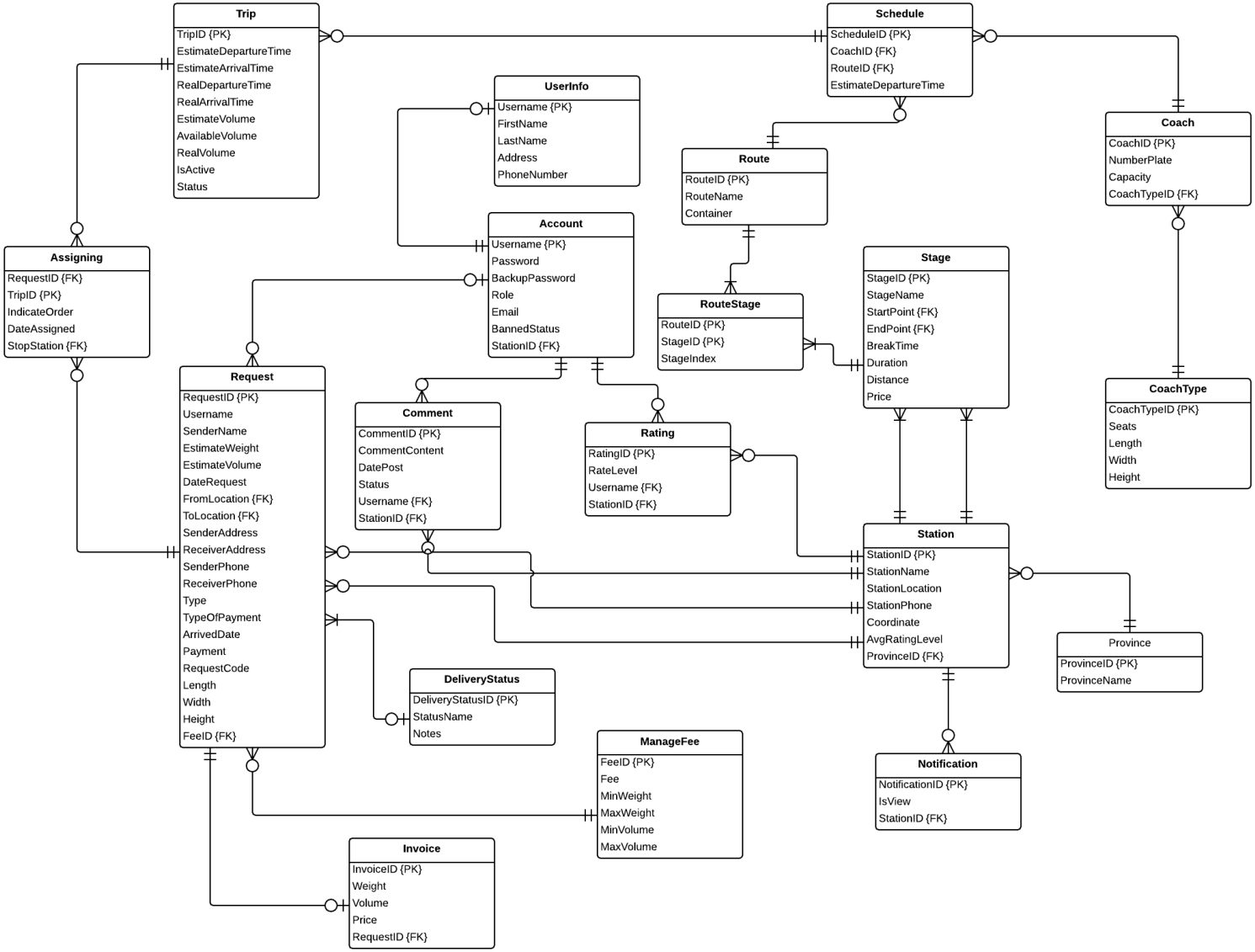

Trip
TripID {PK}
EstimateDepartureTime
EstimateArrivalTime
RealDepartureTime
RealArrivalTime
EstimateVolume
AvailableVolume
RealVolume
IsActive
Status
Schedule
ScheduleID {PK}
CoachID {FK}
RouteID {FK}
EstimateDepartureTime
UserInfo
Username {PK}
FirstName
LastName
Address
PhoneNumber
Coach
CoachID {PK}
NumberPlate
Capacity
CoachTypeID {FK}
Route
RouteID {PK}
RouteName
Container
Account
Username {PK}
Password
BackupPassword
Role
Email
BannedStatus
StationID {FK}
Assigning
RequestID {FK}
TripID {PK}
IndicateOrder
DateAssigned
StopStation {FK}
RouteStage
RouteID {PK}
StageID {PK}
StageIndex
Stage
StageID {PK}
StageName
StartPoint {FK}
EndPoint {FK}
BreakTime
Duration
Distance
Price
CoachType
CoachTypeID {PK}
Seats
Length
Width
Height
Request
RequestID {PK}
Username
SenderName
EstimateWeight
EstimateVolume
DateRequest
FromLocation {FK}
ToLocation {FK}
SenderAddress
ReceiverAddress
SenderPhone
ReceiverPhone
Type
TypeOfPayment
ArrivedDate
Payment
RequestCode
Length
Width
Height
FeeID {FK}
Comment
CommentID {PK}
CommentContent
DatePost
Status
Username {FK}
StationID {FK}
Rating
RatingID {PK}
RateLevel
Username {FK}
StationID {FK}
Station
StationID {PK}
StationName
StationLocation
StationPhone
Coordinate
AvgRatingLevel
ProvinceID {FK}
Province
ProvinceID {PK}
ProvinceName
DeliveryStatus
DeliveryStatusID {PK}
StatusName
Notes
ManageFee
FeeID {PK}
Fee
MinWeight
MaxWeight
MinVolume
MaxVolume
Notification
NotificationID {PK}
IsView
StationID {FK}
Invoice
InvoiceID {PK}
Weight
Volume
Price
RequestID {FK}

Figure 5. Logical database design

The details of each relation are specified below

3.2.2.1. User

Column Name	Type	Allow Null	Default Value	P/F Key	Description
Username	int		-	PK	Username of user
Password	nvarchar(50)		-		Password of user
BackupPassword	nvarchar(50)		-		Backup password for user
Role	nvarchar(50)		-		Role of user in the system: customer, admin or staff
Email	nvarchar(50)		-		Email of user
Phone	nvarchar(50)		-		Phone of user
BannedStatus	bit		-		User is banned or not
StationID	int		11	FK	The station of the staff belong to (just for staff account)

Unique: Username.

Foreign key: StationID.

3.2.2.2. UserInfo

Column Name	Type	Allow Null	Default Value	P/F Key	Description
Username	nvarchar(50)		-	FK	Username of user registered to the system or the staff
Firstname	nvarchar(50)		-		Firstname of user registered to the system or the staff
Lastname	nvarchar(50)		-		Lastname of user registered to the system or the staff
Address	nvarchar(500)		-		Address of user registered to the system or the staff

Unique: Username.

Foreign key: N/A.

3.2.2.3. Coach

Column Name	Type	Allow Null	Default Value	P/F Key	Description
CoachID	int		Auto generated	PK	Uniquely identifies of the coach
NumberPlate	nvarchar(50)		-		Number plate of coach
CoachTypeID	int		-	FK	The type of coach

Unique: CoachID, NumberPlate.

Foreign key: CoachTypeID (table CoachType).

3.2.2.4. CoachType

Column Name	Type	Allow Null	Default Value	P/F Key	Description
CoachTypeID	int		Auto generated	PK	Uniquely identifies of the coach
Seats	int		-		The number of seats of the coach, that define the type of coach
Capacity	float				The percentage of the cabin that coach can be serving.

Unique: Seats.

Foreign key: N/A.

3.2.2.5. Route

Column Name	Type	Allow Null	Default Value	P/F Key	Description
RouteID	int		Auto generated	PK	Uniquely identifies a route
RouteName	nvarchar(50)		-		The name of route

Unique: RouteID.

Foreign key: StartPoint (table Station), EndPoint (table Station).

3.2.2.6. Trip

Column Name	Type	Allow Null	Default Value	P/F Key	Description
TripID	int		Auto	PK	Uniquely identifies a

			generated		route
EstimateDepartureTime	time		-		The estimate time for the trip departures in each day
RealDepartureTime	time		-		The real time that the trip departures in a specific day
EstimateArrivalTime	time		-		The estimate time for the trip departures in each day
RealArrivalTime	float				The real time for the trip arrival to the station in a specific day
AvailableVolume	float				The volume that the coach on this trip can deliver
Date	date				The date that trip start.
RouteID				FK	The route that the trip traveling on
CoachID				FK	The coach of this trip.

Unique: RouteID.

Foreign key: RouteID (table Route), CoachID (table Coach).

3.2.2.7. Station

Column Name	Type	Allow Null	Default Value	P/F Key	Description
StationID	int		Auto generated	PK	Uniquely identifies a route
StationName	nvarchar(50)		-		The name of the station
StationLocation	nvarchar(50		-		The address of location
BreakTime	float		-		The default break time that for each trip come to this station
StationPhone	nvarchar(50)		-		The telephone number of this station
Description	nvarchar(500)		-		The description for this station

Longitude	float		-		The longitude of the station location
Latitude	float		-		The latitude of the station location
Province	nvarchar		-		The province of the station location

Unique: StationID.

Foreign key: N/A.

3.2.2.8. Schedule

Column Name	Type	Allow Null	Default Value	P/F Key	Description
ScheduleID	int		Auto generated	PK	Uniquely identifies the volume
CoachID	Int		-		Uniquely identifies the coach used to scheduling
RouteID	Int		-		Uniquely identifies the route to be scheduled
EstimateDepartureTime	time		-		The minimum volume the coach can be deliver on the route
EstimateArrivalTime	time		-	FK	The route in this volume define

Unique: N/A.

Foreign key: CoachID (table Coach), RouteID (table Route).

3.2.2.9. Request

Column Name	Type	Allow Null	Default Value	P/F Key	Description
ScheduleID	int		Auto generated	PK	Uniquely identifies the volume
ArrangeID	float		-		The maximum volume the coach can be deliver on the route
EstimateDepartureTime	time		-		The minimum volume the coach can be deliver on the route

EstimateArrivalTime	time		-	FK	The route in this volume define

Unique: N/A.

Foreign key: ArrangeID (table CoachArrangement).

3.2.2.10. DeliveryStatus

Column Name	Type	Allow Null	Default Value	P/F Key	Description
DeliveryStatusID	Int		Auto generated	PK	Uniquely identifies the delivery status
StatusName	nvarchar(50)		-		The name of delivery status of the package
Note	nvarchar(500)	X	-		Some more description for the status

Unique: DeliveryStatusID.

Foreign key: N/A.

3.2.2.11. Invoice

Column Name	Type	Allow Null	Default Value	P/F Key	Description
InvoiceID	Int		Auto generated	PK	Uniquely identifies an invoice
Weight	float	X	-		Weight of package
Volume	int	X	-		Volume of package
Price	float		-		Price of delivery service
RequestID	int		-	FK	The request that the invoice point to

Unique: InvoiceID.

Foreign key: RequestID (table Request).

3.2.2.12. ManageFee

Column Name	Type	Allow Null	Default Value	P/F Key	Description
FeeID	int		Auto generated	PK	Uniquely identifies a fee rule
Fee	float		-		The fee of this weight and volume range

MinWeight	float		-		The minimum weight of the weight range
MaxWeight	float		-		The maximum weight of the weight range
MinVolume	float		-		The minimum volume of the volume range
MaxVolume	float		-		The maximum volume of the volume range

Unique: FeeID.

Foreign key: N/A.

3.2.2.13. Comment

Column Name	Type	Allow Null	Default Value	P/F Key	Description
CommentID	int		Auto generated	PK	Uniquely identifies the comment
Username	nvarchar(50)		-	FK	The user post comment
CommentContent	nvarchar(4000)		-		Content of comment
DatePost	date		-		Date that user post the comment
Status	bit		-		Approve or reject the comment
StationID	int		-	FK	The station that customer comment for

Unique: CommentID.

Foreign key: Username (table User), StationID (table Station).

3.2.2.14. Rating

Column Name	Type	Allow Null	Default Value	P/F Key	Description
RatingID	int		Auto generated	PK	Uniquely identifies the rating
Username	nvarchar(50)		-	FK	The user post comment
RateLevel	int		-		The level of rate: from 1 to 5
StationID	int		-	FK	The station that user rating for

Unique: RatingID.

Foreign key: Username (table User), StationID (table Station).

3.2.2.15. Assigning

Column Name	Type	Allow Null	Default Value	P/F Key	Description
CoachID	int		-	PK	The ID of coach for the specific request
RequestID	int		-		The ID of request
IndicateOrder	int		-		The indicated order of the assigning the package of this request

Unique: (CoachID, RequestID).

Foreign key: N/A.

3.2.2.16. Stage

Column Name	Type	Allow Null	Default Value	P/F Key	Description
CoachID	int		-	PK	The ID of coach
StartPoint	int		-	FK	The start position (station) of the stage
EndPoint	int		-	FK	The end position (station) of the stage
Duration	float		-		The estimate duration (in hours) for moving on this route
Distance	float		-		The estimate distance (in km) between start and end location
Container	float		-		The percentage of coach that allow to travel on the stage
Price	float		-		The fee for travel on the stage

Unique: N/A.

Foreign key: StartPoint, EndPoint.

3.2.2.17. RouteStage

Column Name	Type	Allow Null	Default Value	P/F Key	Description

RouteID	int		-	PK	The ID of route
StageID	int		-		The ID of stage
StageIndex	int		-		The index of stage in the list stage of the route

Unique: N/A.

Foreign key: N/A.

3.2.2.18. Notification

Column Name	Type	Allow Null	Default Value	P/F Key	Description
ID	int		-	PK	The index of notification
Username	Int		-		Username of user
StationID	int		-		The ID of station the user mange's
isView	bit		-		Status of notification, it is seen by user or not.

Unique: N/A.

Foreign key: StationID, Username.

3.2.2.19. Province

Column Name	Type	Allow Null	Default Value	P/F Key	Description
ProvinceID	int		-	PK	The index of province
ProvinceName	nvarchar(50)		-		Name of province

Unique: N/A.

Foreign key: N/A.

3.2.3. Physical database design

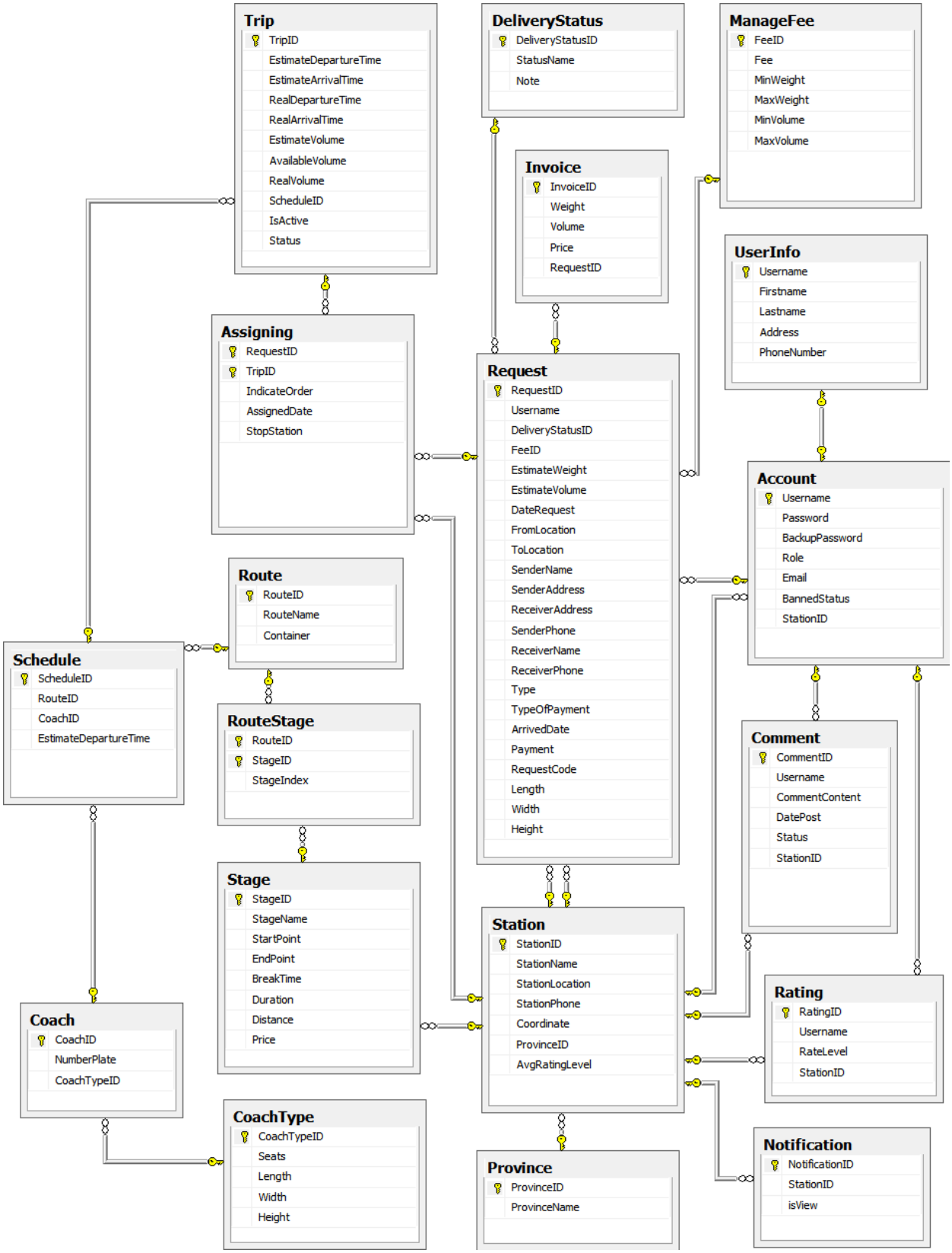


Figure 6. Physical database design

Appendix

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