SLOTH EXPRESS

PACKAGE DELIVERY SYSTEM REQUIREMENT SPECIFICATION

1452764 何冬怡 1452798 李 想 1452697 彭嘉琦 1593369 Luc Berro

CONTENT

1 Introduction

Sloth Express is a system built for logistic companies, which provides them with solution to logistics tracking, goods packing, goods distribution, after-sales management, data storage, information processing, etc. It aims at increasing the field people's working efficiency, the efficiency of delivery, and reducing the errors made by human inputs, etc. Temporarily private orders are not covered in the business scope, which means the express company corporates with e-commercial companies only.

The system provides web application —for customer and manage staff, android/IOS application —for postman (UI mockup is present below). These applications provide different functions for different users to enhance user experience and has some humanization design (e.g. using different colors to mark tasks as reception or delivery in postman's app). Besides basic functions, the system also provides some advanced functions, like printing invoices. Different offline payment methods are supported. And the customer's telephone number is hidden to protect his/her privacy.

The postman is equipped with a multifunctional special device, when customer receive his/her package, he/she can use this device to pay by card and can also press thumb on it to sign digitally, besides, the device helps collect postman's GPS location accurately.

Functions the system provides are as follows (Take Taobao as representative for the e-commercial companies):

For customer

Tracking Package: He/she can track their packages with the package barcodes manually from the web app provided by the system, or check the messages on Taobao which accesses our system via APIs we provide for e-commercial companies.

Managing Orders: If the package is damaged or lost, the customer can choose to cancel the order or ask for redelivery.

After-sales Service: The customer can give package to the postman if he/she is unsatisfied as long as he/she has come to agreement with Taobao.

Representative Service: He/she can ask a representative to sign the package if he/she is not available. (Confirmation from the customer himself/herself would be put at the first place.)

Printing Invoices: If customer asks for invoices when delivery, invoices will be printed and added in the packages.

For postman

Rescheduling: If the customer is not at home and there is no representative when delivery, the postman would reschedule the delivery upon the agreement with the customer and notify him/her when the schedule is made.

Offline payment: The postman can give the money to company when the customer pays offline.

Managing packages: The postman can mark the packages as completed and checking history packages, etc.

Unexpected condition handling: In case the packages are damaged or lost, he/she can record the information of the product on the system, meanwhile he/she could notify customers.

Others

Dispatching Packages: All packages would be classified according to destination.

Settling Account: The express company could settle account with Taobao regularly.

GPS Tracking: The system would update the postman's location regularly and send data back.

Information Processing: Like receiving package status and pushing notifications to postman, etc.

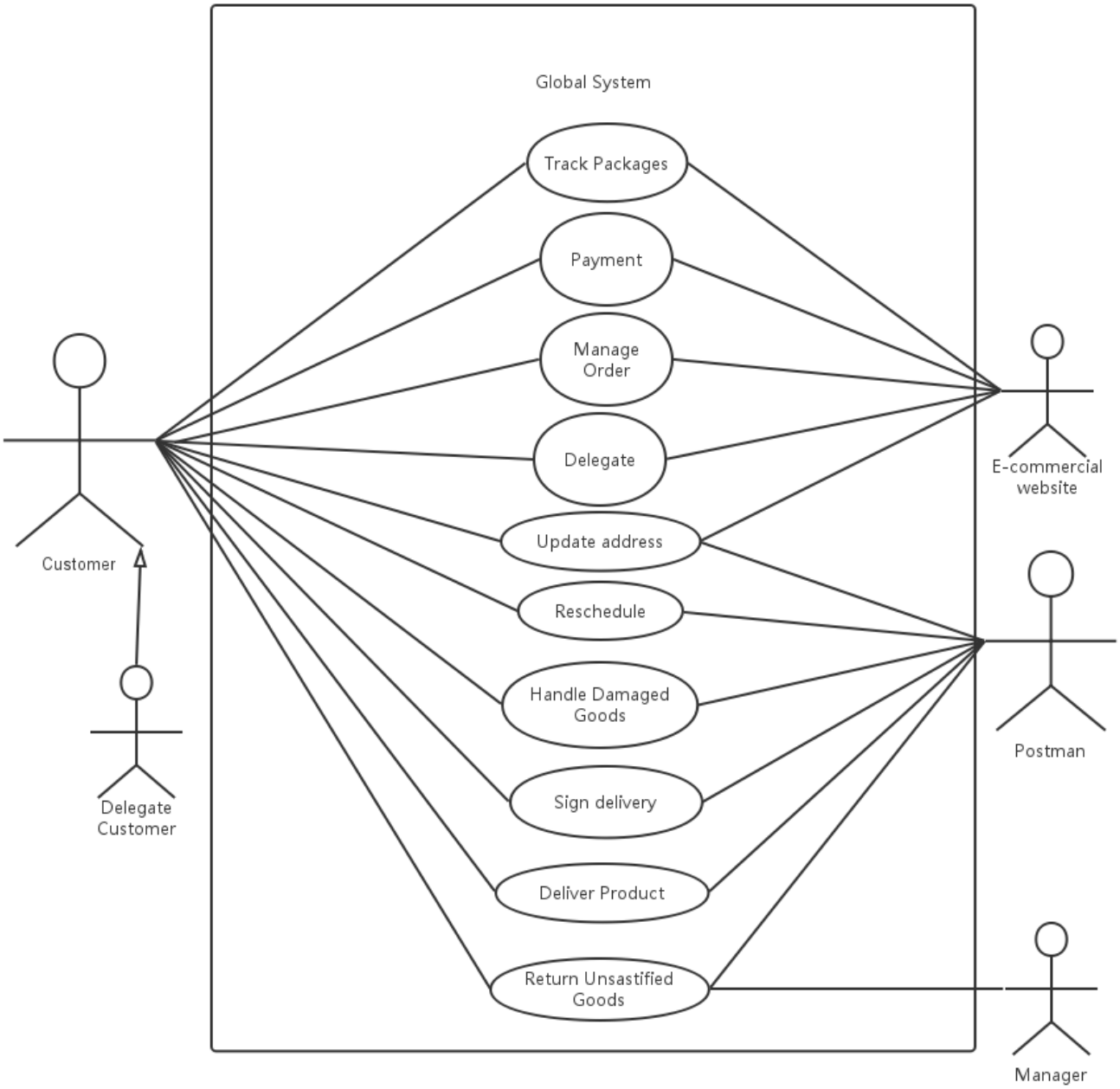
2 Use case modelling

2.1 General System

Brief Description

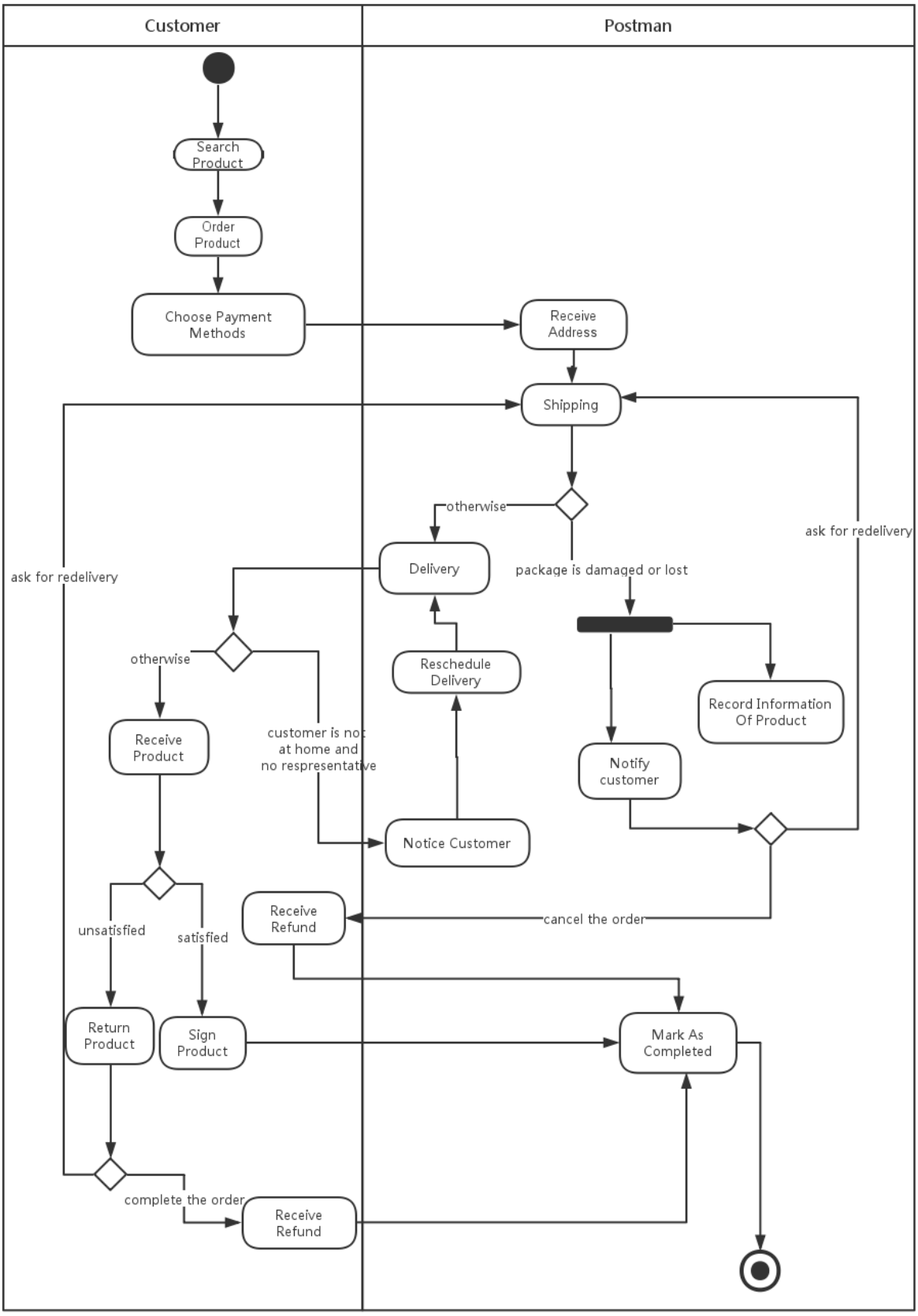
We divide the system into different subsystems and the general system diagram show the architecture of entire system.

Use Case Diagram



Use Case Diagram 1 General System

Activity Diagram



Activity Diagram 1 Main

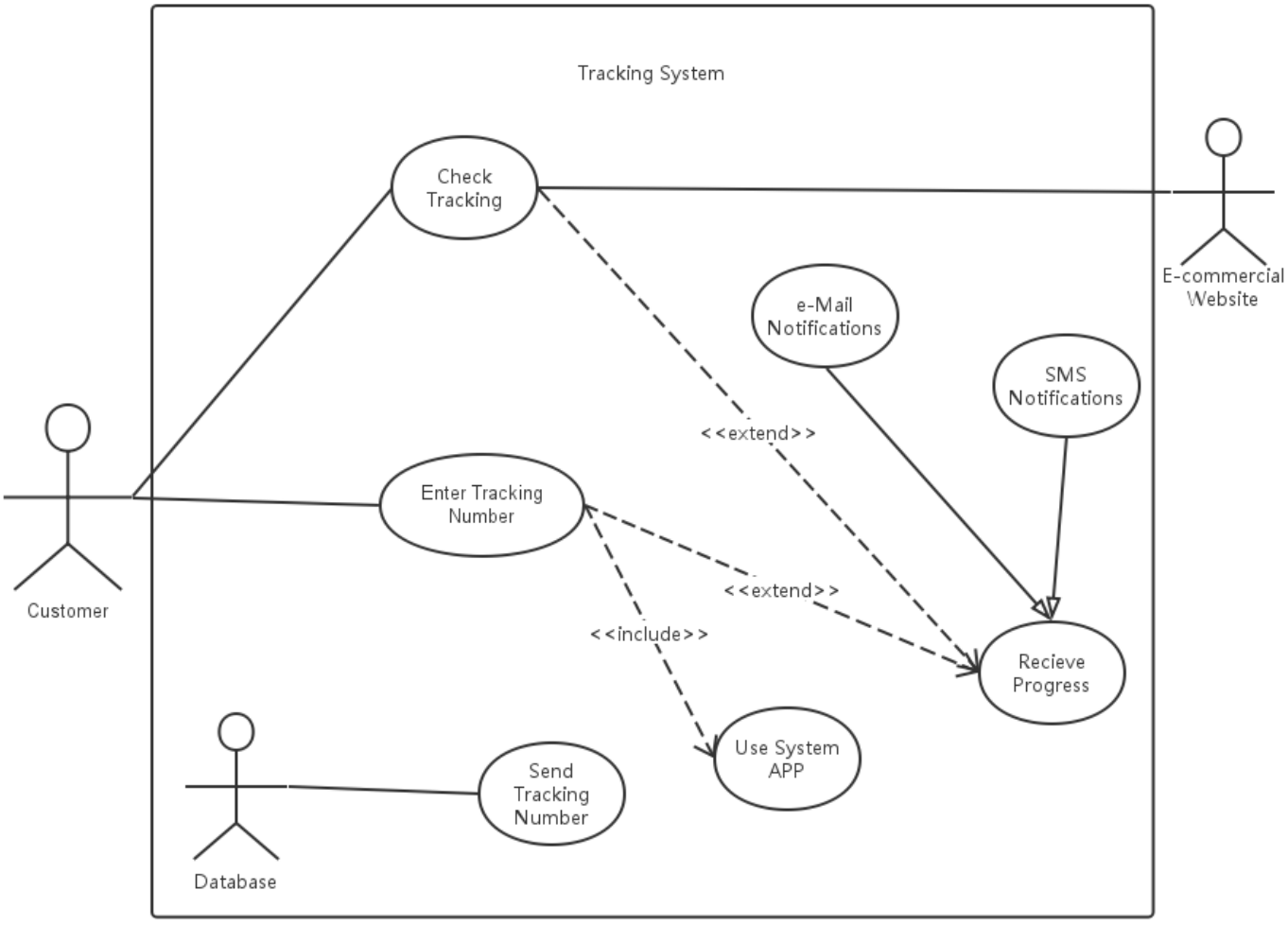
2.2 Tracking System

Brief Description

To track the order, the Customer must either log into the store website to check its order or by entering the tracking number in any APP of the system (Web APP/Phone APP).

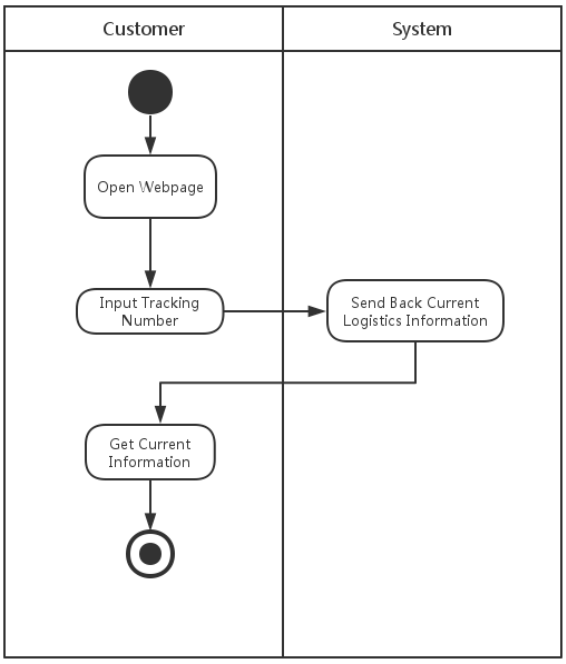
For further tracking, the system can handle the trackings notifications by either e-Mail or by SMS. The Customer just needs to ask for it.

Use Case Diagram



Use Case Diagram 2 Tracking System

Activity Diagram



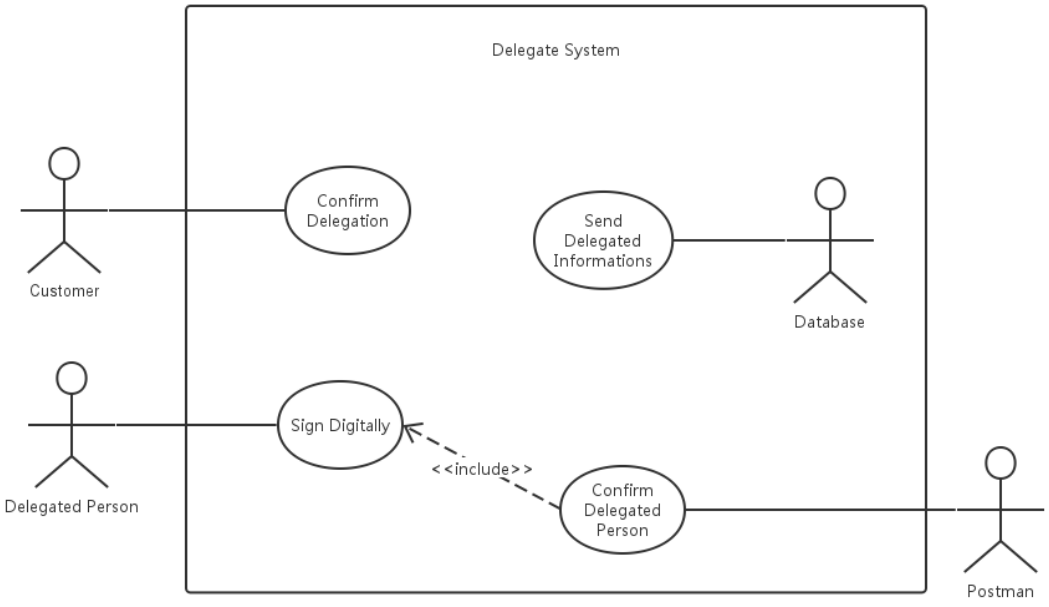
Activity Diagram 2 Tracking Packages

2.3 Delegate System

Brief Description

A representative must be confirmed by the Customer. The system is then notified, the Postman receive the information and knows that he must let the delegated person sign digitally the product.

Use Case Diagram



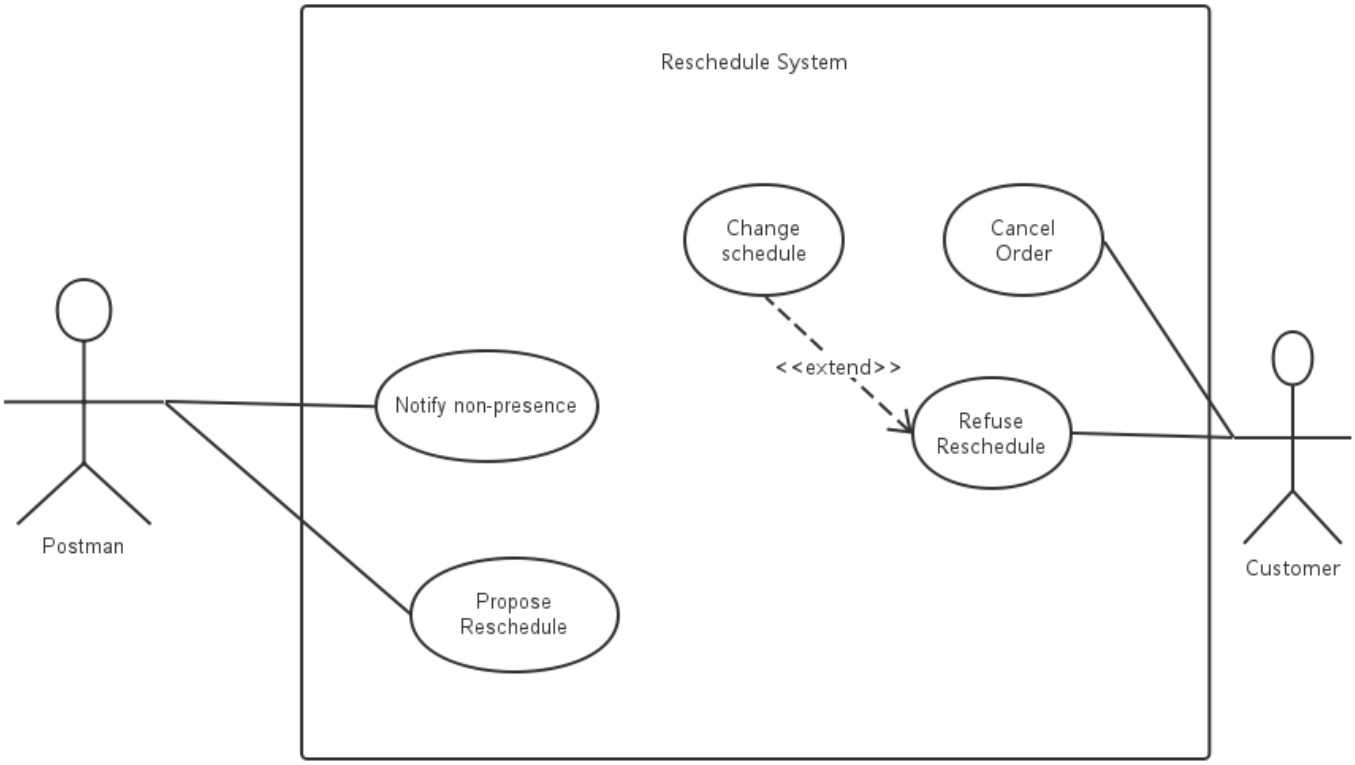
Use Case Diagram 3 Delegate System

2.4 Reschedule System

Brief Description

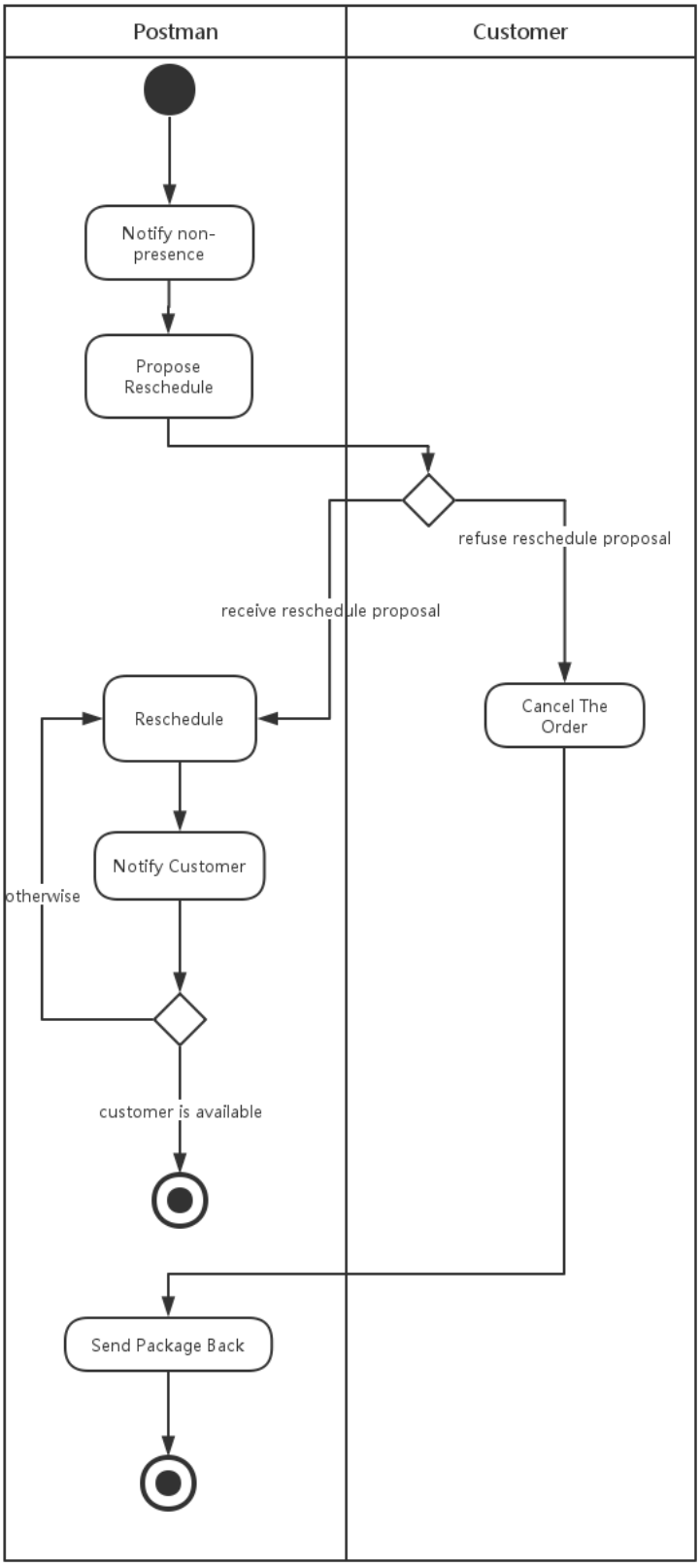
The reschedule system is done when the postman notify to the system (thanks to the Special Device) the non-presence of the customer. Once the system is notified, a new schedule is appointed. The customer can then accept or change the new appointment. The Postman wil then deliver the order at this new schedule.

Use Case Diagram



Use Case Diagram 4 Reschedule System

Activity Diagram



Activity Diagram 3 Rescheduling

2.5 **Payment System**

Brief Description

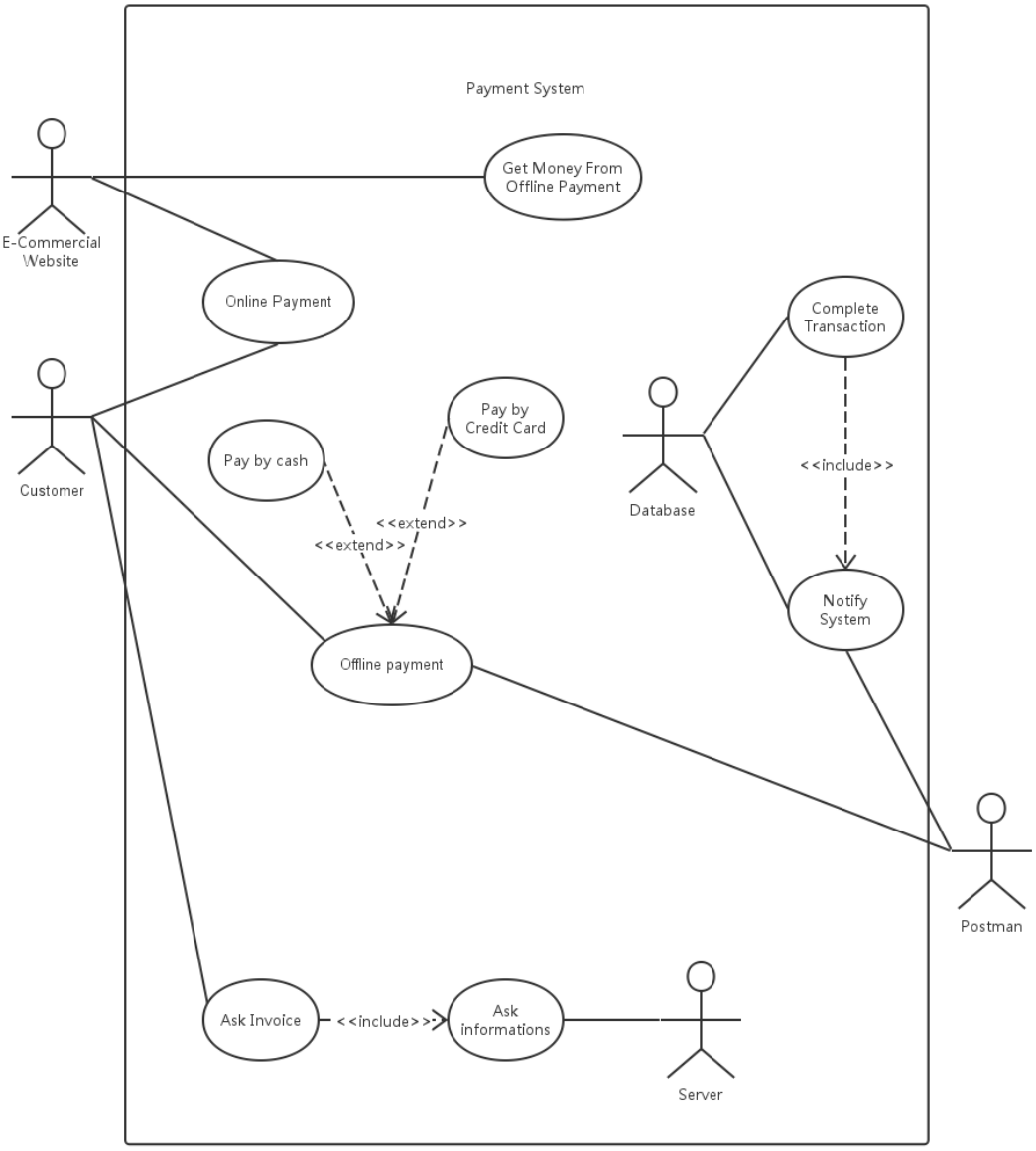
The Customer can do its online payment by using different mode of payment, he can also do the offline payment by paying by cash.

For the online payment, the system may send a request for a confirmation of the payment, by asking to the Customer's bank, via phone call or SMS.

For offline payment, the cash must be given once the order has been received. The system is then notified, and the transaction is marked as "completed".

Also, the customer can ask for invoice. The information of invoices are received by the Server.

Use Case Diagram



Use Case Diagram 5 Payment System

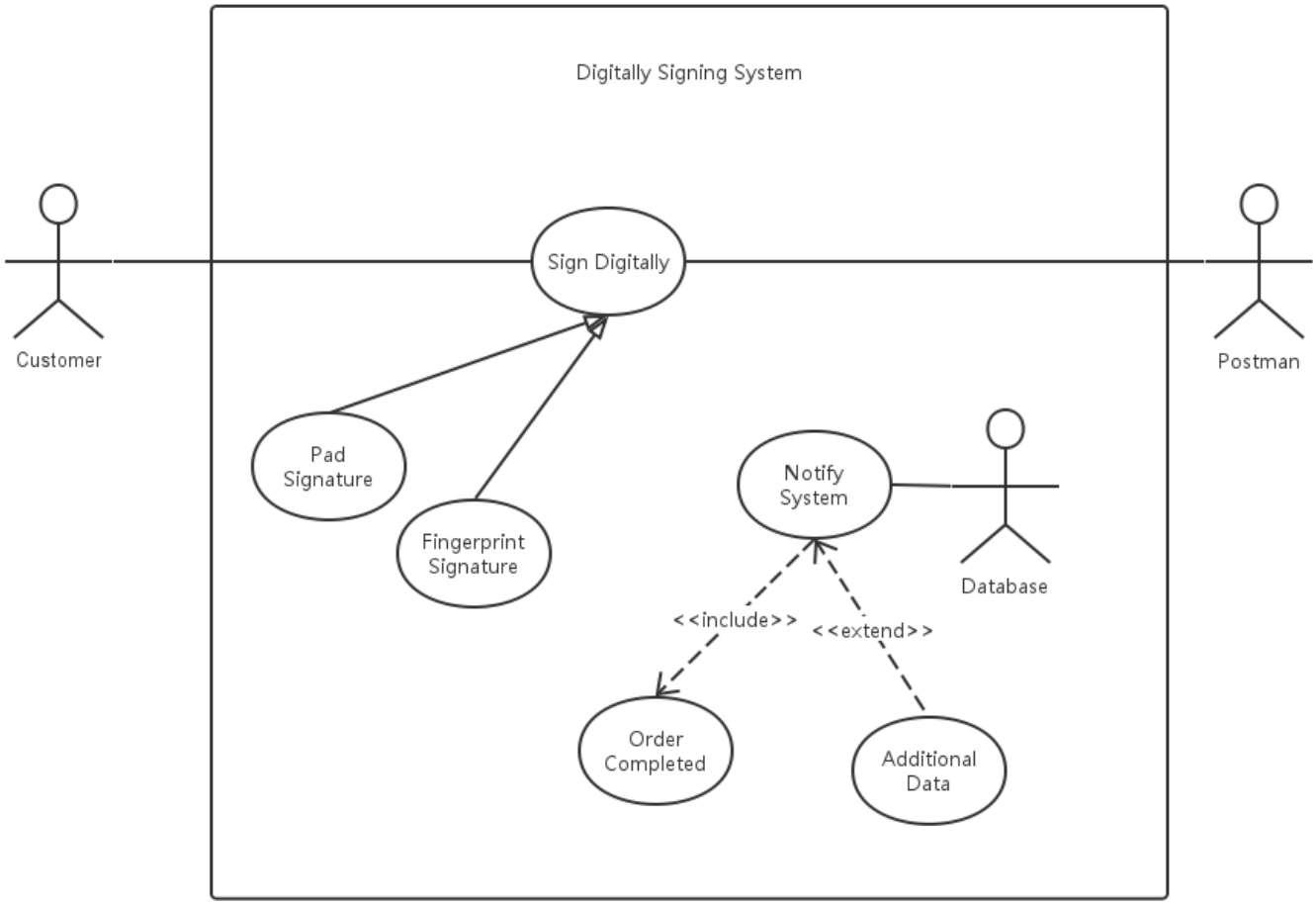
2.6 Digitally Signing System

Brief Description

The digitally signing system is handled by the Postman. Once he delivers the product to the Customer, the Postman offers the possibility to sign digitally. The Customer must sign digitally by either using the Pad Signature or the Fingerprint Signature, depending of the choices and requirements of the order.

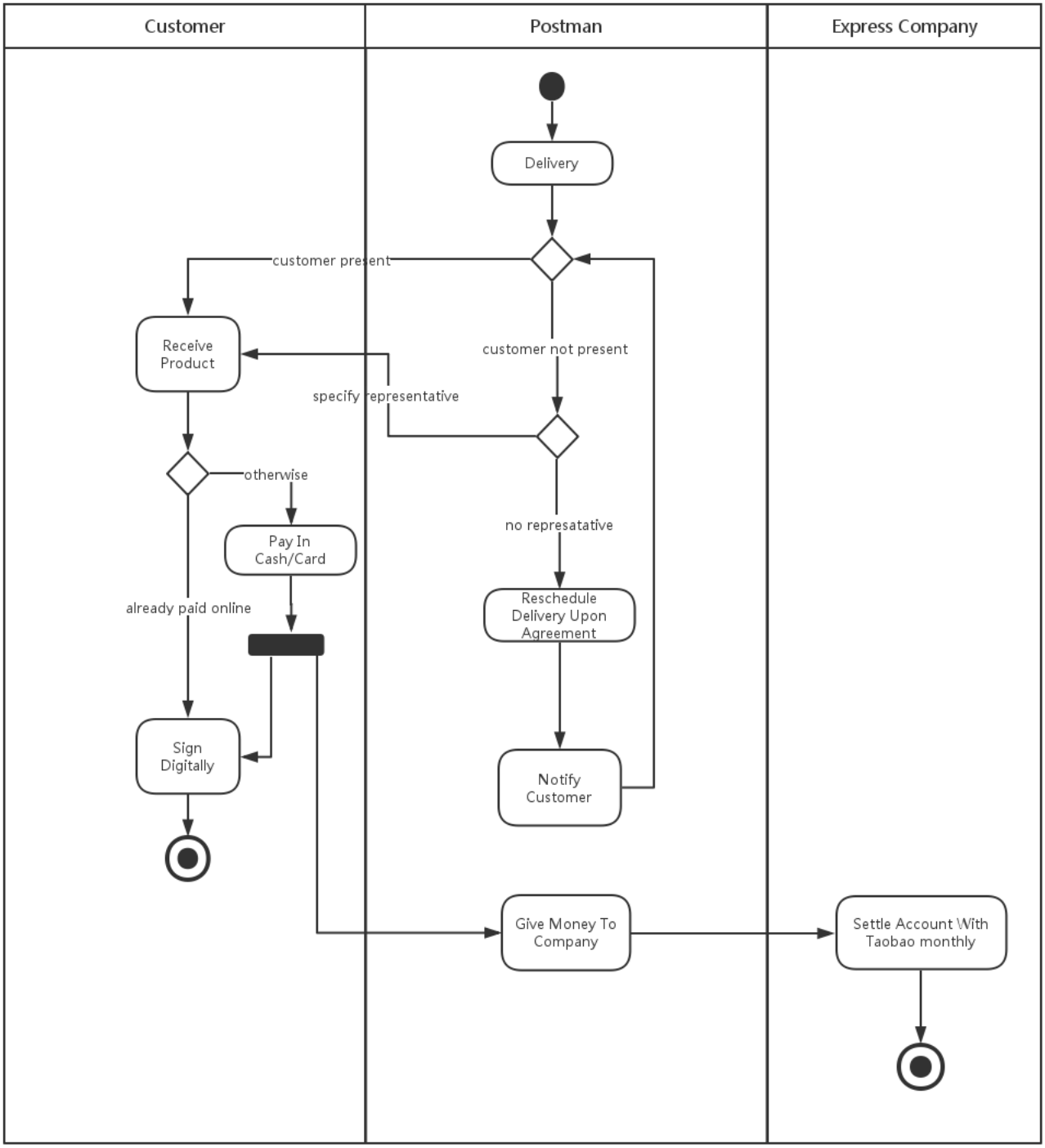
Once it's done, the system is notified, additional data can be sent to the database. Finally, the order is marked as "completed" into the database.

Use Case Diagram



Use Case Diagram 6 Sign System

Activity Diagram



Activity Diagram 4 Signing & Paying

2.7 Delivery System

Brief Description

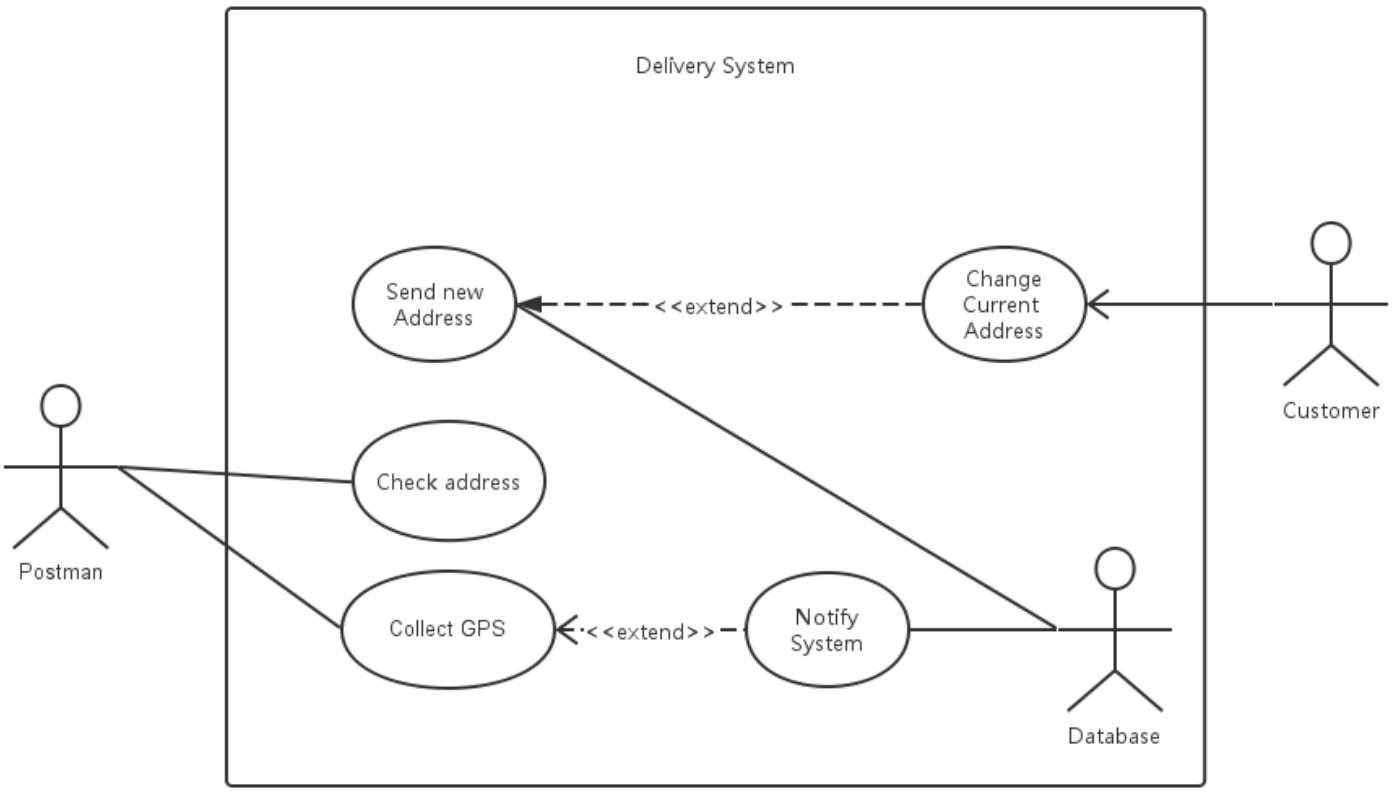
For the delivery system, the Postman can receive the Address or call the Customer for further details. Theses information are crypted, it means for example that the Customer's phone number isn't directly displayed on the special device.

The Postman can simply call the Customer without knowing the number, it is hidden and also crypted inside the special device.

To deliver the product, the Postman must receive the address.

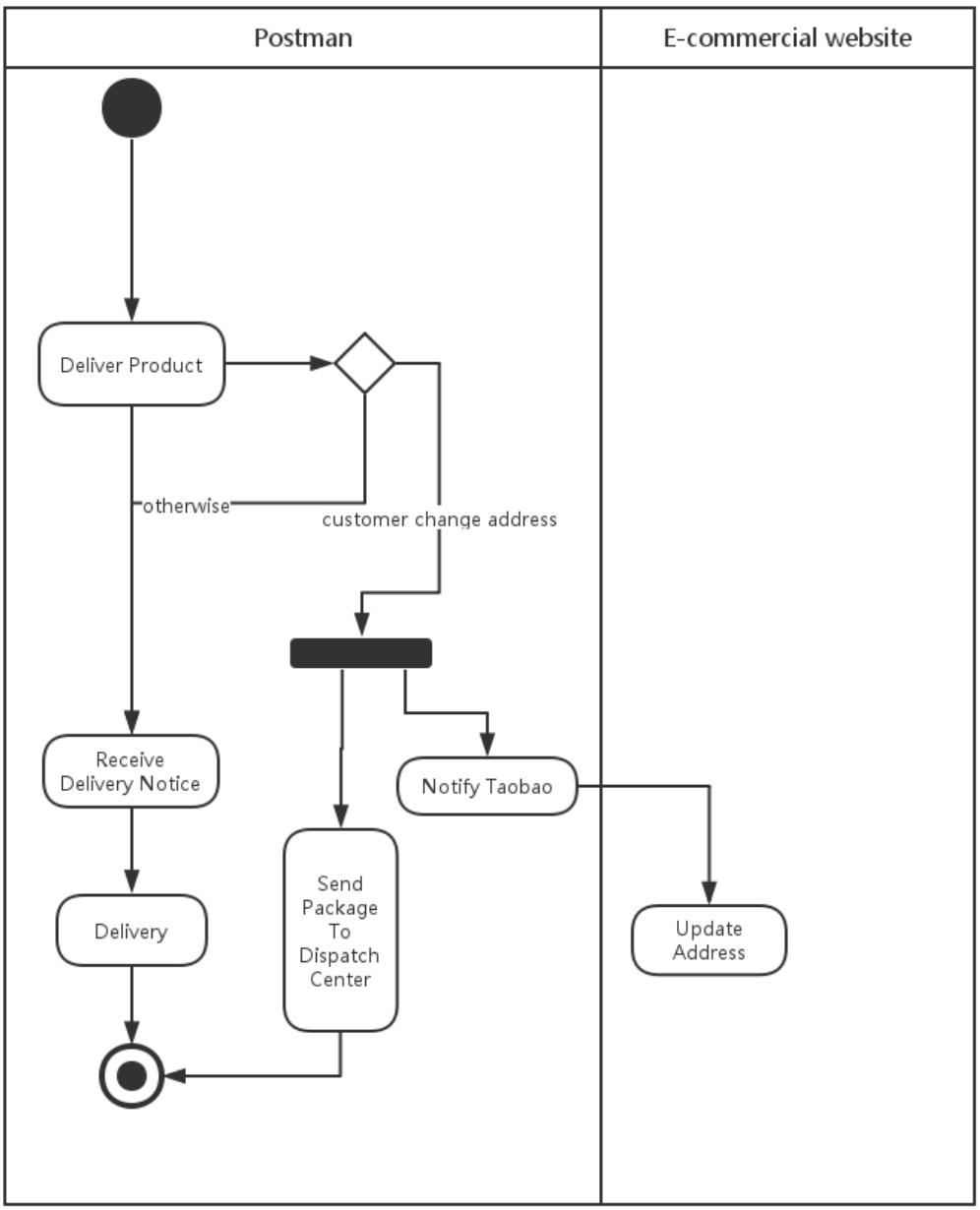
Each location visited, the Postman must use the special device to collect the GPS data, the database will be notified if it is an already existing location or if it is a new one.

Use Case Diagram



Use Case Diagram 7 Delivery System

Activity Diagram



Activity Diagram 5 Delivering

2.8 Damaged Delivery System

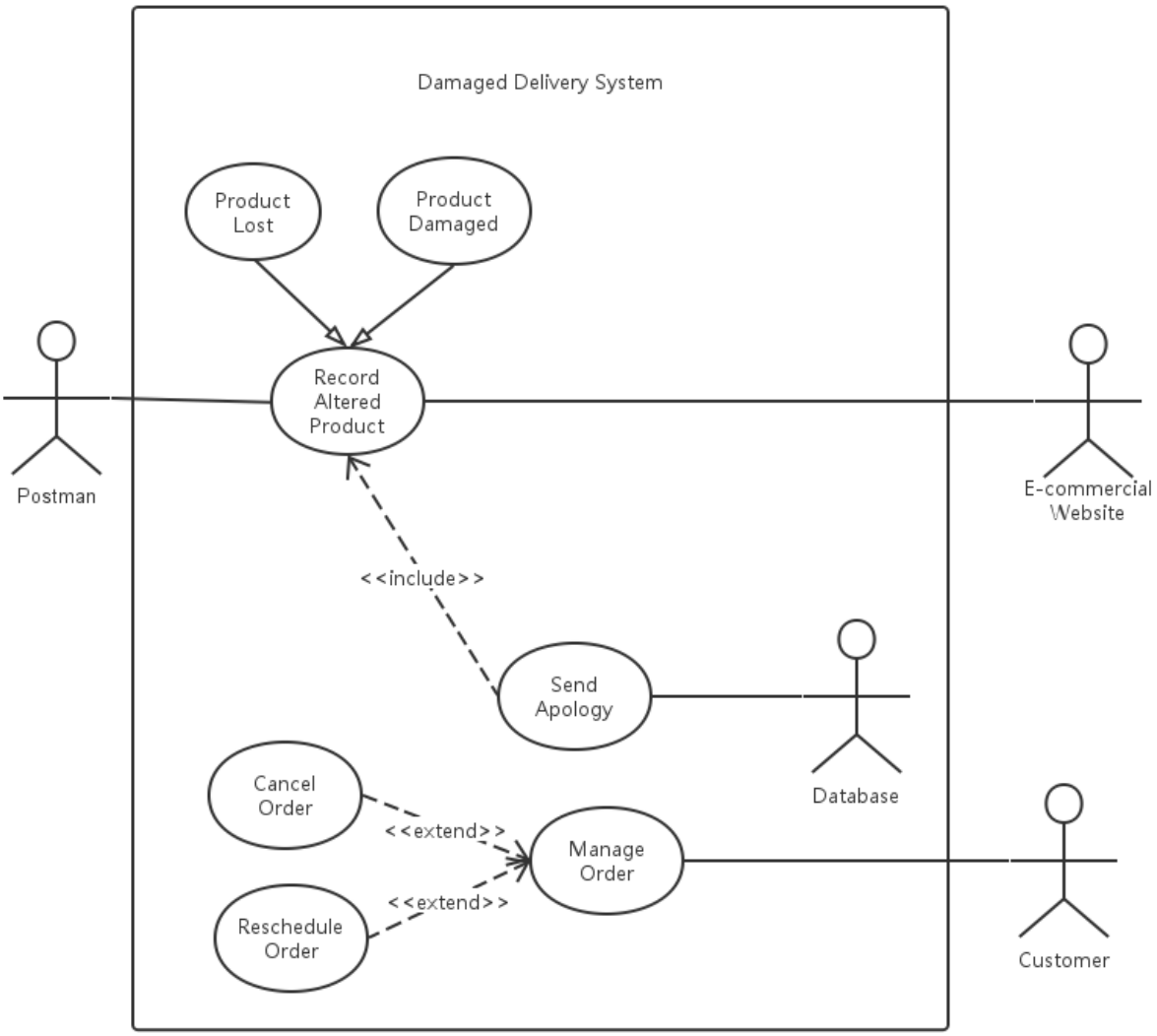
Brief Description

When the product is lost or damaged, the Postman must notify the system. By notifying the system, the server updates the information and send directly an apology to the Customer.

The Customer has then two options, he can either cancel his order or reschedule it. The reschedule, once made, will allow the Postman to deliver once

again the product, without the altered status.

Use Case Diagram



Use Case Diagram 8 Damage Delivery

2.9 Unsatisfied Product Returning System

Brief Description

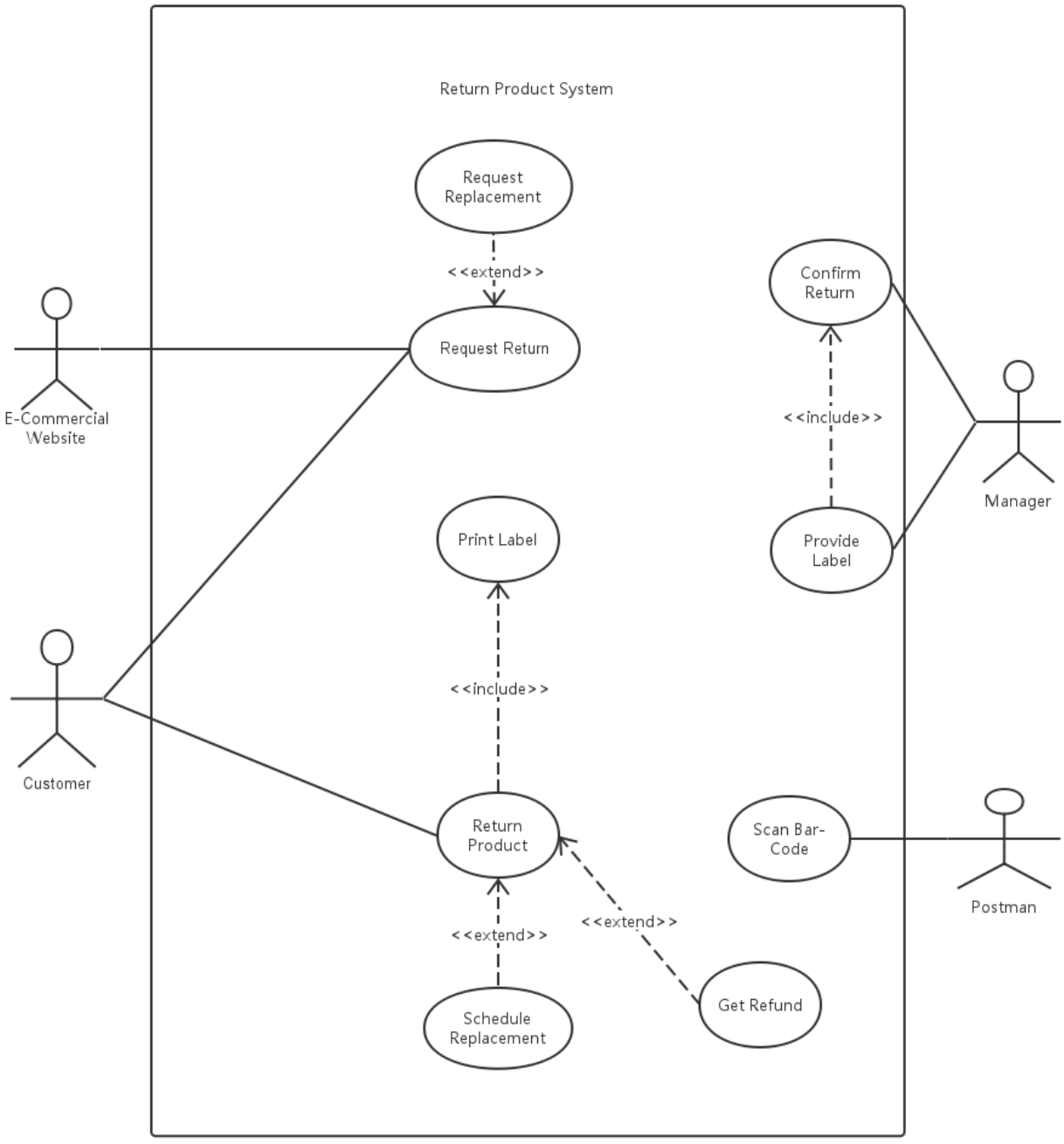
This use-case explains the scenario about the unsatisfied product by the Customer actor. The Customer, within one month of his order, can notify the system that he wants to return the product.

By doing this request, the user has two options: he can request a send-back or request a replacement. But because the send-back must be done before a replacement, the "Request Send-Back" use case is included.

The validity of the request must be confirmed by the Manager, once it's the case, he can provide the printable label to the customer.

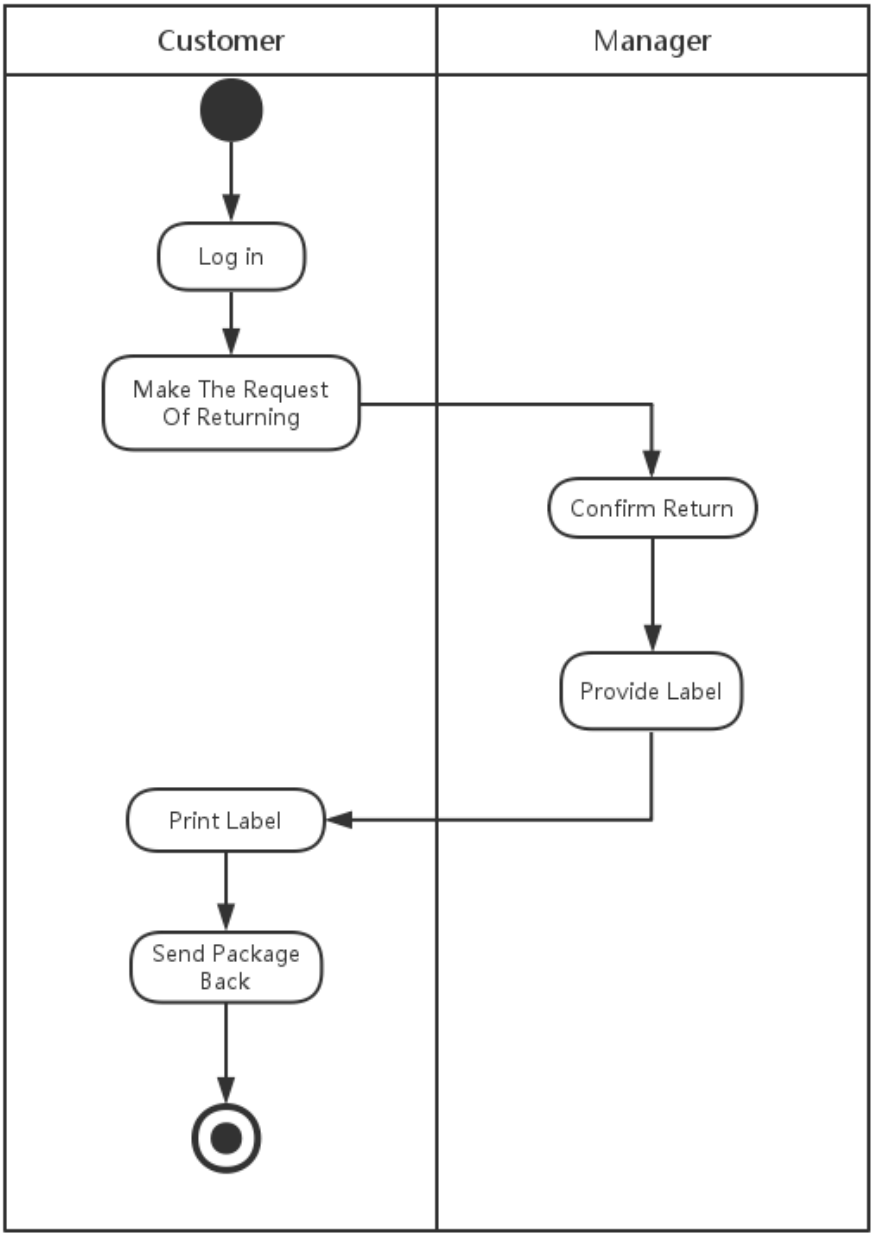
The Customer has to print the label and then the Postman must scan the bar-code on it. Finally, the Postman can deliver the product back to the storage.

Use Case Diagram



Use Case Diagram 9 Returning System

Activity Diagram



Activity Diagram 6 Returning Product

3 Glossary of terms

Barcode

A graphic identifier, including all the information of the package, such as the logistic company, the delivery information and the addresses of seller and customer.

Customer

Buying something on the website, rescheduling the package and waiting to receive his package.

Database

Including all the information about customers, postmen and packages. If customer or postman wants to get something from it, the system will check their jurisdiction and decide to offer it or not.

Delegated person

When the customer can't sign the package by himself, the delegated person can substitute for him.

Delivery ways

Customers can choose home delivery, picking up by himself and delegating any shops or someone who can sign the packages.

E-commercial website

Customers can buy everything they need on it, and cooperates with our logistic business.

Fingerprint using

A signing method of identifying the fingerprint of customers.

Log in

Only the postman can use this module. The postman's account includes his delivery history and the packages he will deliver.

Logistic business

It's responsible for delivering products, mails or documents to customer locations nationwide.

Manager

Confirming the information reported by postman and providing label and returns unsatisfied goods.

Map

Today's tasks will show on a map by little pins, and the pin has the same color as the corresponding task.

Notify system

When the customer finishes signing the package, the system will update the delivery information automatically and notify the manager that this task is finished.

Pad signature

In this way, customer can use a magnetic pen to sign his or her name on the

screen to sign packages digitally.

Payment methods

Customers can pay the bill online or offline, and the offline paying method includes cash or credit card.

Postman

Delivering, receiving, reporting and rescheduling the package.

Sloth Express

It's our App, which is designed for postman. They can check new tasks, confirm the finished package and report each problem to the system from it. It has iOS edition and Android edition.

Special device

A device for postman, with functions of fingerprint identification, swipe card, and accurate GPS positioning, which can be connected to postman's cellphones via Bluetooth.

Task icon

In Sloth Express, we use Rose Quartz to mark the sending task. Meanwhile, Serenity is used to mark the delivery task. In this way the postman can divide his tasks clearly.

Web page

Our web page is designed for customers. On this page they only need to input the courier number, and then they can track the delivery information of their packages easily. Especially, customers can do this thing without logging in.

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4 Supplementary specification

Scale of data volume

When the data volume reaches the size of billion or more, any single database can't store the whole data and we will use distributed data storage.

Search engine & sort algorithm

When we face the billions of data, the search engine is essential.

What's more, how to sort the information we search from data storage is important. So, we give a complicated sort algorithms or recommender system.

Number of current users

We consider that maybe our website is visited by billions of people every day, so we use a larger scale distributed cache. All the information of the bills, the customers and the postmen are fetched from the cache. In this way we can deal with the enormous number of concurrent users.

Performance

The users always search the information of bills, so we make the server do quickly to avoid refreshing the web page again and again.

Operation and maintenance system

To support such a huge website, we need as much as servers.

Also, a user-friendly operating system should be deployed to the servers.

If we need, the kernels of the operating system should be improved.

And we optimize the communication module like QQ.

If some problem happens, we will give a plan to roll back.

Privacy of users

To protect our customers' privacy, we design a module for postmen, which can make them communicate with his customers convenient and not catch the telephone information of customers.

Fingerprint identification

When a customer chooses to use his fingerprint to sign for the bill, the special device should get his data from the database, and this information is collected when the customer use our system at the first time.

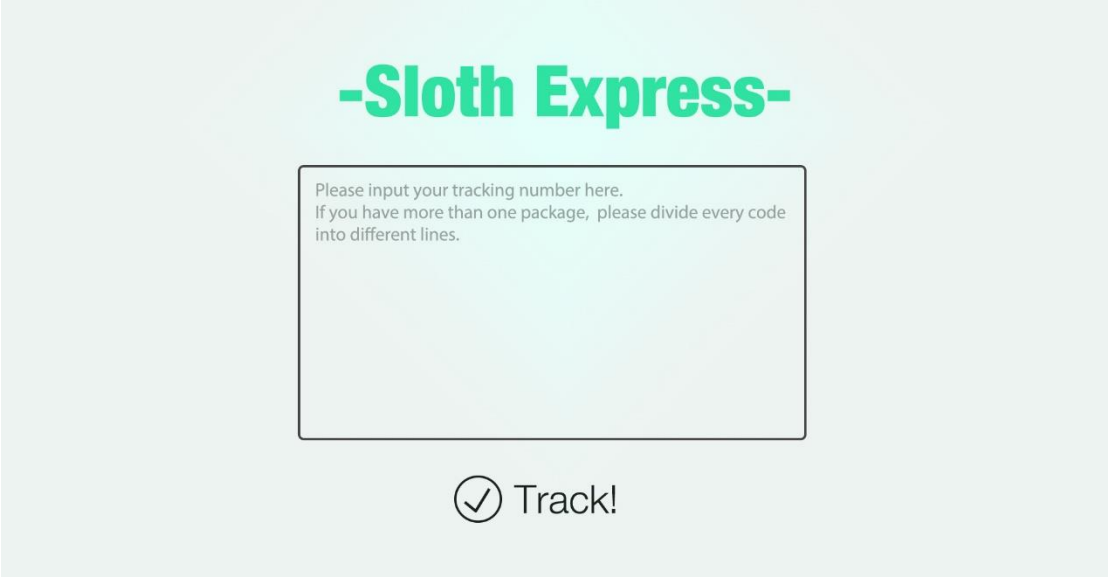
5 User interface

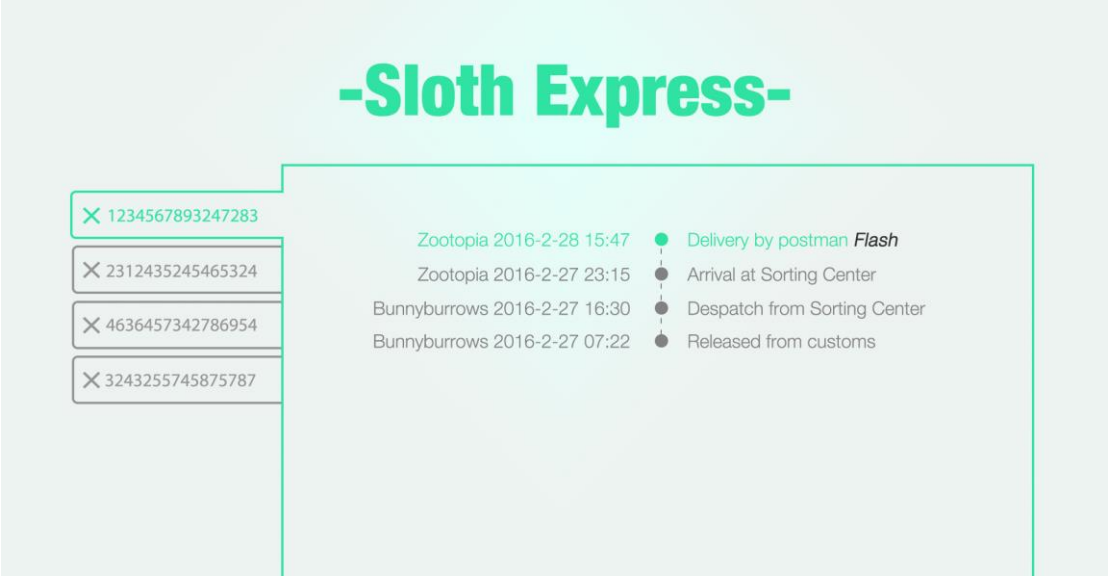
5.1 Customer – Web APP

To provide quick and easy access for customer to package tracking, our system provides a website which allows customers to track multiple packages a time. The website is mobile friendly so that customer can see where their packages go anytime by any devices.

The UI is concise without any garbage, and there are few images in the pages. With this design customer can easily find where to input and where to click, which enhances speed of loading as well as user experience.

On the other hand, our system also provides API of package tracking, so customer can track their packages in e-commercial websites' user interface.

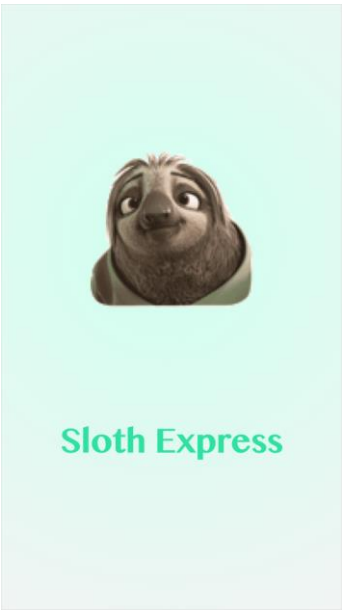




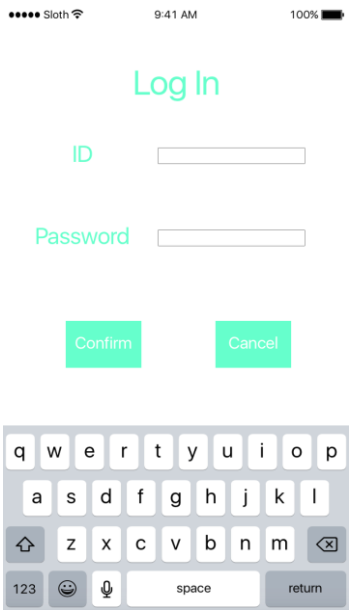
5.2 **Postman**

For postman, we provide iOS/Android APPs, which will help them about delivery.

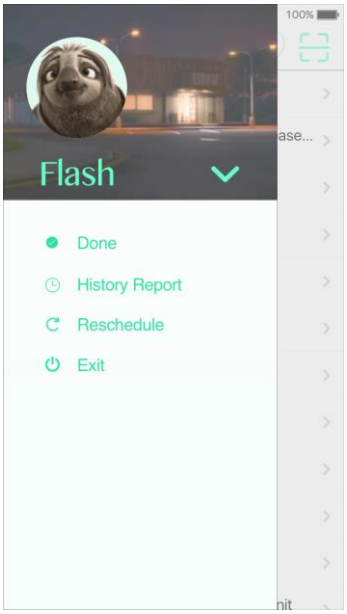
5.2.1 iOS APP



Welcome Page



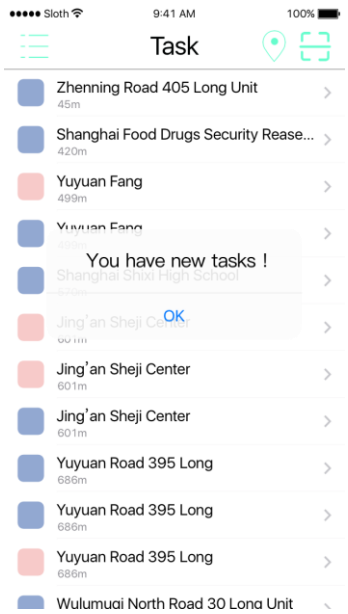
Log in Page



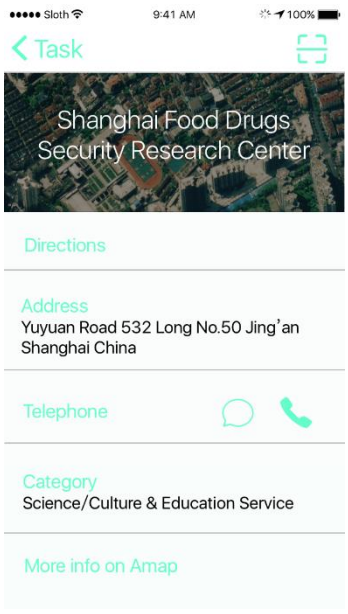
Postman Info

When a postman opens the application, if he/she hasn't been login, he/she will be asked to input the ID and password.

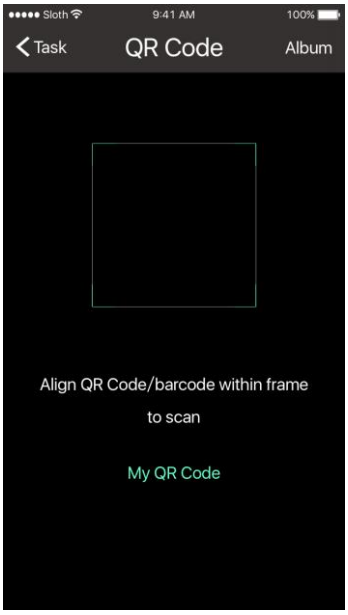
At most times the app will login by default, and postman can slide right to see the history task list and reschedule tasks. Postman's profile is shown on the top.



Current tasks

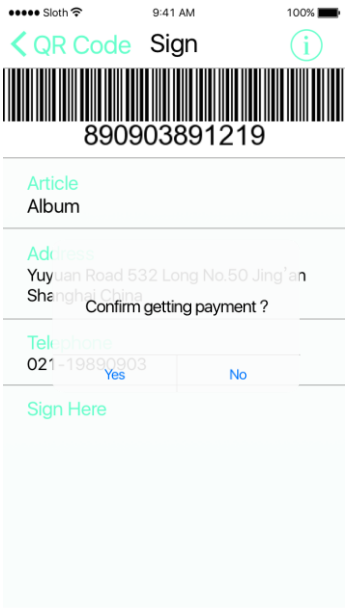


Task Details

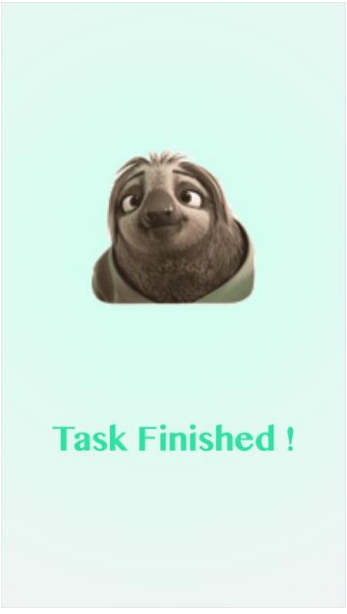


Scan Barcode

Maps view



Signing page



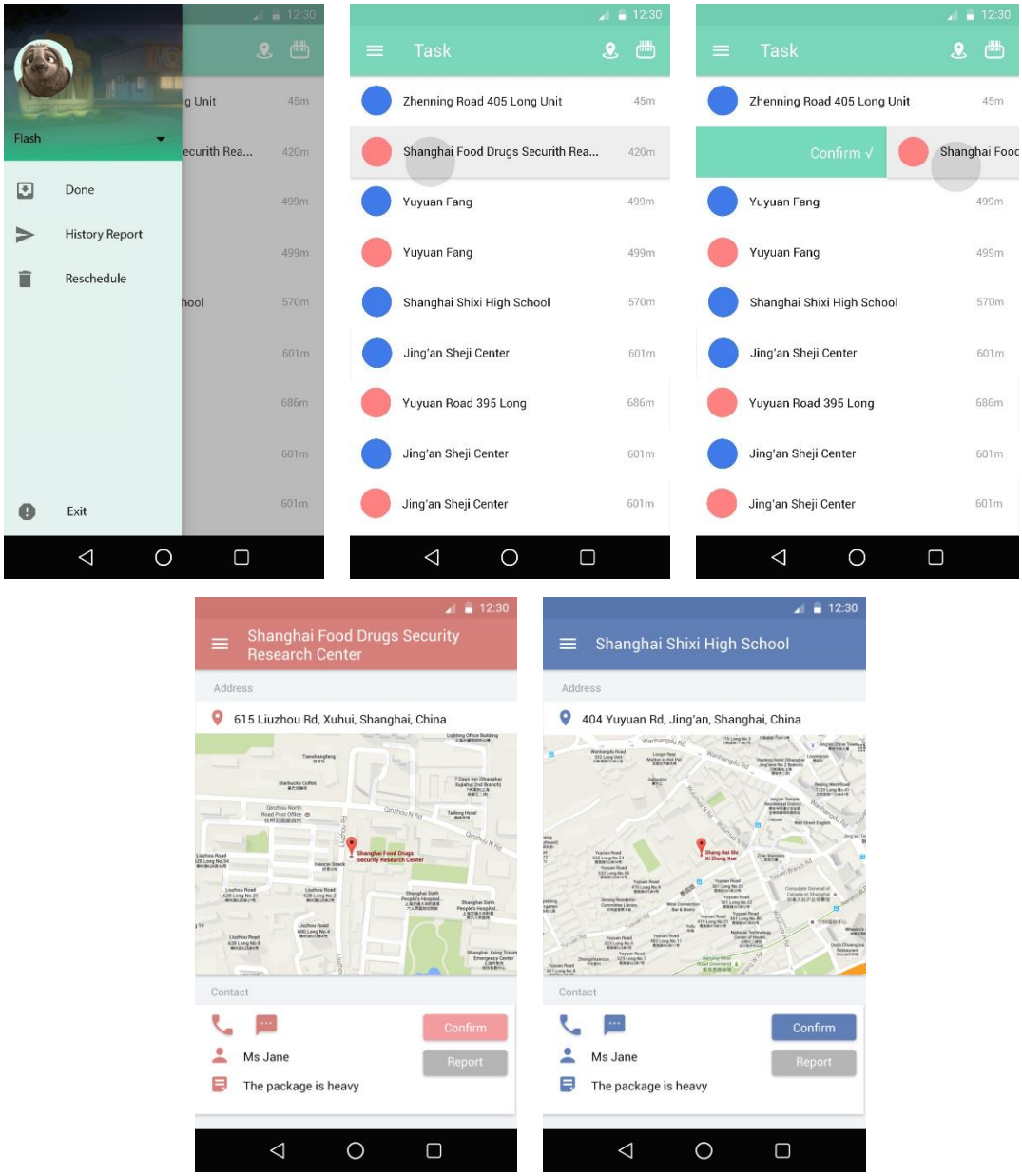
Finish Page

In the main view is the current task list. Reception tasks are marked as red and delivery tasks are marked as blue. Postman can click the map button to see the distribution of tasks and the app will compute the best path automatically. If there's a new task, the app will alert the postman.

Click tasks to see details of packages and notify customer by SMS/Calling button without seeing customers' phone number, which protect customers' privacy.

Confirm packages quickly via scanning packages barcode.

5.2.2 Android APP



Basically similar with iOS version but obey style in *Material Design Guide.*

6 Reference Documentation

[1] Jim Arlow,Ila Neustadt. Practical Object-Oriented Analysis and Design [M]. Upper Saddle River: Addison-Wesley Professional, 2005

This thoroughly revised edition provides an indispensable and practical guide to the complex process of object-oriented analysis and design using UML 2. It describes how the process of OO analysis and design fits into the software development lifecycle as defined by the Unified Process (UP).
UML 2 and the Unified Process contains a wealth of practical, powerful, and useful techniques that you can apply immediately.

[2] Simon Bennett,Ray Farmer. Applying UML and Patterns [M]. New York: McGraw-Hill Education, 2010

Applying UML and Patterns is the world's #1 business and college introduction to "thinking in objects"—and using that insight in real-world object-oriented analysis and design.
Drawing on his unsurpassed experience as a mentor and consultant, the author helps you understand evolutionary requirements and use cases, domain object modeling, responsibility-driven design, essential OO design, layered architectures, "Gang of Four" design patterns, GRASP, iterative methods, an agile approach to the Unified Process (UP), and much more.

[3] Craig Larman. Object-oriented Systems Analysis and Design Using UML [M]. Upper Saddle River: Prentice Hall, 2004

This book reflects the most up-to-date approaches to information systems development. The book provides a clear, practical framework for development that uses all the major techniques from UML 2.2. It follows an iterative and incremental approach based on the industry-standard Unified Process, placing systems analysis and design in the context of the whole systems lifestyle.

7 Contributions of team members

1452764 何冬怡(Leader)

Document summary and arrangement;
UI mockups of Web & Android apps;
General diagram of use case diagram;

1452798 李 想

UI mockups of iOS app;
Supplementary Specification;
Glossary of terms;
Reference documentation;

1452697 彭嘉琦

Main introduction of SRS document;
Activity diagrams;

1593369 Luc Berro

Use case diagrams;
Descriptions of use cases;

8 Enclosure

8.1 Modelling file of diagrams

With URLs below to view our team diagrams:

Use case diagram:

General System	http://www.processon.com/view/link/570f662be4b0b211bf997845
Digitally sign system	http://www.processon.com/view/link/570f6558e4b0b352eb14cf3c
Delivery System	http://www.processon.com/view/link/570f6591e4b0b211bf996e5e
Delegate System	http://www.processon.com/view/link/570f65b0e4b0b211bf99709c
Payment System	http://www.processon.com/view/link/570f6667e4b0a22216984ea5
Returning product	http://www.processon.com/view/link/570f6688e4b0b352eb14e259
Tracking System	http://www.processon.com/view/link/570f66ede4b0a222169856c2
Damage Delivery	http://www.processon.com/view/link/570f670ce4b0a222169858b0
Reschedule System	http://www.processon.com/view/link/570f6735e4b0b211bf9988f3

Activity diagram:

Main	http://www.processon.com/view/link/570f67c4e4b0a222169863f7
Delivering Product	http://www.processon.com/view/link/570f67ebe4b0b352eb14f7c8
Rescheduling	http://www.processon.com/view/link/570f6800e4b0b352eb14f8f8
Returning Product	http://www.processon.com/view/link/570f682ae4b0b352eb14fb4e
Signing & Paying	http://www.processon.com/view/link/570f6845e4b0b211bf9998d1
Tracking package	http://www.processon.com/view/link/570f686ae4b0a22216986cfe

8.2 UI mockups images

Web UI	/WebUI
Android UI	/AndroidUI
iOS UI	/iOSUI