

Britehouse - GeeXpo project – Project 3

DELIVERY ROUTING AND TRACKING

Project = 85% of mark

Documentation = 15% of mark

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BRIEF

A functional workshop was held to analyse the requirements of the solution. People contributing to the workshop included:

- The IT Manager
- The delivery manager
- The delivery planner
- Representatives from the drivers
- Representatives from the customers

DELIVERY MANAGER

In our company, we have several vehicles doing deliveries of consignments, packages and envelopes containing products shipped to customers, documentation and invoices, payments, gifts and other items. We have trucks, minivans, and smaller three wheeled delivery vehicles. They have different load capacities and not all the vehicles can carry all the types of packages we must deliver. They have different costs to operate, and different ranges from the depot they can cover.

We have several drivers on rotation throughout the week. Our drivers have licenses for specific vehicle types, so not all the drivers can drive all the vehicles. There are two drivers assigned to each truck and minivan for each shift, and one driver for the smaller vehicles. We do deliveries every day of the week, starting at 8h00 until 17h00. We also do deliveries on Saturdays, 08h00 until 13h00.

Sometimes deliveries are urgent or not on our daily routes, and then we may use an external delivery company.

We have problems tracking our fuel costs against the deliveries. The drivers have company fleet cards for refueling vehicles, but those payments can't easily be correlated to the daily delivery schedule. We suspect that we could optimize our fuel costs by choosing more optimal routes.

We do receive traffic fines via the mail for our vehicles. We can't easily identify which drivers and deliveries those fines relate to, so it's hard to do anything about that. We also can't always figure out why the trucks would be at those locations at the time of the fine.

We take a reading of the kilometers travelled per vehicle every day, but those readings show that we're driving way more kilometers than we've expected based on the routes we've planned. Somewhere we're deviating from the routes but it's hard to track when and why.

We do sometimes have to change our delivery plans, but this is challenging for us because we don't always know where the vehicles are and when they reach our clients. We urgently need better tracking and statistics so that we can improve the management of the deliveries.

DELIVERY PLANNER

We don't always know exactly when our products will be packaged and ready for delivery, so we create tentative deliveries for future days but those need to be refined as the products become available and packaged for delivery. We have limited storage space so once the products are ready, we really need to deliver them as soon as possible.

There can be confusion about the delivery addresses. Some deliveries go to the customer's office address, but some consignments must be delivered to the sites where our customers are working. Sometimes the delivery is incorrectly addressed to the customer office address; and often when the delivery is addressed to the site, the site location has not been verified and is wrong.

Every time a vehicle leaves the depot, it has a delivery schedule that lists the packages in the vehicle and where they need to be delivered to. The drivers sign for the delivery schedule and leave the depot to do the deliveries.

| | |
|---------------------|--------------|
| Truck Registration: | ABC123 |
| Drivers: | Fred, George |

[illegible]

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As you can see, it lists the deliveries with the reference to the package and the contact for the delivery.

When there are problems with deliveries, such as deliveries running late, missing packages or changing the delivery order, we communicate with the drivers via cellphone and give them new instructions. Sometimes they will need to change the order of deliveries, delay some deliveries to another day, or come back to the depot for different packages and instructions.

It would be nice to be able to schedule the deliveries for specific times of the day and reprioritize on the fly, so that we don't need to intervene with phone calls.

It would also be nice to know which deliveries are completed in real time, so that we can see if we're running behind schedule and change the plan if we need to. Currently, we confirm that the delivery is complete by contacting the recipient via phone, which is not ideal.

We need a better way of ensuring the correct packages are on the vehicles for delivery. If we do find that a package is on the wrong vehicle, it would be nice to be able to add that delivery to the delivery sheet for that vehicle easily without having to make phone calls, and be able to see the impact of that change on the delivery schedule.

IT MANAGER

We currently do have a public web site, but we don't have a public facing portal that employees can log into. The drivers currently do not have access to our systems and do not have accounts on our network, so if we are going to give them an online system for real time tracking this will need new technical design and infrastructure.

We have considered cloud hosting and are open to using such a service, as the delivery information is not private and has a minimal risk for our organisation.

Currently, we don't have devices or internet access in the vehicles. Some of the drivers do have smart devices, but they are different and don't all have the same capabilities. We have considered a program for allocating a device to a vehicle or assisting drivers in purchasing a personal device, but we don't have a business case for that yet.

We believe that if we can get this solution right, managing deliveries well is a problem for other companies as well. We think there may be a possibility to offer this solution to other customers as a hosted solution, and generate additional revenue.

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DRIVERS

It's nice to have a delivery schedule but the plans don't survive once the rubber hits the road.

We use map books to figure out where the addresses are and sometimes the addresses are ambiguous and we go to the wrong locations.

Based on the locations we look up, we often find that it doesn't make sense to follow the list from the top to the bottom. Sometimes a short detour on the way to the furthest delivery can significantly reduce the distance we need to travel for the day, because we can deliver some packages as we go. Because we don't know which customers have been promised deliveries at a specific time, this can get us into trouble.

We regularly receive phone calls giving us different instructions for the delivery schedule, and then we must go to locations in an order we didn't plan and that can result in backtracking and having daily routes that cross each other several times. This means we drive for longer than we planned, and cover more distance.

We use our own phones on the road, and when we need to make phone calls we sometimes run out of airtime. We can claim airtime and get reimbursed, but the process takes long and if we don't have enough airtime we sometimes can't place calls.

We also can get stuck in traffic or end up taking routes that are not suitable to the type of vehicle we're driving. This can result in us being pulled over, or sometimes getting into bumps and scrapes.

When we've travelled a distance and then get the instruction to return to the depot for missing packages or urgent deliveries, that severely impacts our travel time.

CUSTOMER

When we place orders, we typically need the deliveries on specific dates and times. Some of the deliveries are bulky and we don't have enough long-term storage, so the goods stay out in the weather and they can get damaged or stolen.

We communicate the delivery dates and times we need to the salesman when we place the order. However, the deliveries are often scheduled for different dates and times, and we are not informed. We need to phone the delivery people in the days leading up to the delivery to confirm, and they're not always available. Even when we do confirm the delivery schedule, it often doesn't happen the way we planned. For us, there can be a significant difference in receiving our delivery early in the morning, when our staff are ready to start work; and later in the day, when the staff must schedule overtime to catch up, or even find a way to store the goods for the next day.

We sometimes get please call me messages from the drivers, and must call them back. That doesn't seem very professional. We've also heard of times when the drivers sent please call me messages to our office phone number, which doesn't support text.

Especially for time critical deliveries, it would be nice to have a better way to confirm when the delivery is likely to occur, whether there are delays, and how to escalate.

It would also be nice if we didn't have to follow up after the delivery via phone to confirm the delivery.

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ANALYSIS

Answer these questions as part of the documentation for your project:

- How would you describe the problem statement?
- How would you summarize an overview of the proposed solution?
- What are the most critical success factors for the proposed solution?
- What are the business requirements for the proposed solution?
- How would the business requirements be prioritized? Are all business requirements critical to the success of the solution?
- What software features would be needed to meet the business requirements?
- What is the smallest number of features to be implemented to create a minimum viable product? What value would the other features contribute?
- What technologies would you propose?
- What would the conceptual model for this problem domain look like?
- What would the component model for the solution look like?
- What would the application architecture for the solution look like?
- How would the solution ensure good user experience?
- What commercial models could we use to fund the solution? How would this impact the features?
- How long do you have? How much of the solution can you build?

INSTRUCTIONS

1.) Create a professional document that addresses all of the points in the 'Analysis' section. Use the documentation to guide the development of your artefact.

2.) Choose **ONE** of the following artefacts to create:

- Solve the driver's problem
- **or** Solve the customer's problem
- **or** Solve the IT manager and delivery planners' problem

3.) Choose an **appropriate** tool for your selection from point 2. (i.e. Game, website, web-based application, mobile application etc.)

4.) Create an **appropriate database** for your tool selection. (i.e. which options should be included for the driver **or** the customer **or** the delivery planners and IT managers)

RELEVANT TOPICS

Topics that you need to learn about:

- HTML forms - HTML elements that retrieve and send user data to another page.
- Web servers - Servers that serve web content. This content may include both static and dynamic web pages. These servers can also host databases.
- PHP - A server-side scripting language. PHP can be used to dynamically generate web pages and can link to local and remote databases.

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- MySQL - A Database Management System (DBMS).
- phpMyAdmin - A web interface for creating and managing MySQL databases on a web server.
- Android app architecture – what is an Android app made of? This includes concepts such as layouts, views, activities, intents, resources, etc.
- SQLite – this “lite” version of SQL allows you to store app data on your phone.

SOFTWARE

The following software can be used to work on this project. However, others also exist:

- WAMP, XAMPP or EasyPHP - all-in-1 local webserver setup on Windows (includes Apache, PHP and MySQL).
- phpMyAdmin - A web interface for creating and managing MySQL databases on a web server
- Android Studio - the official Android IDE

Note: Please stay away from Microsoft Technologies such as C# and asp.net as well as Flash.

WEBAPP GUIDELINES

- Database design and hosted on the Database server for ITRW 311 (196.253.4.24) – password will be provided
- WebApp should be hosted on the WebServer on rkvl-nx3.puk.ac.za – password will be provided

USEFUL LINKS

The following links serve as starting points when researching the relevant technologies:

- HTML forms, PHP, MySQL - [W3 Schools](http://www.w3schools.com/)
- Web servers - <http://computer.howstuffworks.com/web-server5.htm>
- phpMyAdmin - https://www.youtube.com/watch?v=Ty_tjx4W8MM
- Android developer site: <http://developer.android.com/develop/index.html>