

**FEASIBILITY STUDY  
GARBAGE TRUCK TRACKER**

**21/03/2016**

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## Contents

1	Introduction .....	<b>Error! Bookmark not defined.</b>
1.1	Overview and Objectives of the Project.....	3
1.2	The Need for the Project .....	3
1.3	Scope of the Project.....	4
1.4	Deliverables.....	4
1.5	Overview of Existing Systems and Technology .....	4
2	Feasibility Study.....	5
2.1	Financial Feasibility .....	5
2.2	Technical Feasibility .....	5
2.3	Resource and Time Feasibility .....	6
2.4	Risk Feasibility.....	6
2.5	Social/Legal Feasibility .....	7
3	Considerations .....	7
4	References .....	7

# 1 Introduction

## 1.1 Overview and Objectives of the Project

This section describes what the project is about, what will be developed, input and outputs of the system and objectives of the system.

This system is to make the garbage collecting system of an Urban Council, Municipal council and Town Council more efficient. Using this system, people can be aware of the garbage collecting trucks of their area and properly deliver garbage without any inconveniences. Finally, people can make their neighbourhood a clean and a pleasant.

The system includes a web application, hybrid mobile application for Android, IOS and Windows phone. And a text messaging service for mobile phones.

Real-time location data from GPS tracking devices are input to the system. A detailed real-time map is output with relevant notifications.

## 1.2 The Need for the Project

This section describes the usefulness of the system.

In most of the urban resident areas, there are not any garbage bins. So people have to handover their garbage to the garbage trucks. After doing a quick research, I found out that people face following inconveniences varied from area to area.

- Some areas, the garbage trucks has no tight time schedule. Here, people have two choices. Prepare the garbage parcels early in the day without any rush or right at the very moment when the truck comes with hustle. The first choice will cause bad results, if the truck is absent that day.
- In some areas (e.g. - around university), the garbage trucks are not allowed to use the siren. So the labourers shout, ring gate bells, knock at the gates and inform the neighborhood. So people has to run around and quickly deliver the garbage. If they have not prepared it previously, they faces even more difficulties.
- In some areas, the trucks come only in prescheduled due days. Sometimes they collect only one kind of garbage on some days. People are not fully aware of these variables.
- Garbage trucks usually do not go nook and corner. So the people from small lanes has to come to the main road to deliver the parcels. So they should be acknowledged some extra time ahead.
- In some areas, people have used to give money to the labourers and make them to wait some extra time to pick their garbage. These labourers do not wait much for the other people who does not tip them. So I think this is a bribe more than a tip. (“tips follow the rendering of a service, whereas bribes precede it”) [1]
- Some people are not present at the day time. They prepare the garbage parcels early in the morning and hang them on their gate or place them beside the road. The problem here is, if the truck is absent that day. When they are going to collect the garbage late, it may be staled or destroyed by stray dogs and crows.

### 1.3 Scope of the Project

This section describes the main user roles and list their functionalities within the system.

Real-time location data acquired from GPS location tracker planted on each garbage truck is updated to the data base.

#### **System administrator**

- Updates and manages the system via web interface.
- Observe the truck fleet on a real-time map via web interface.
- View feedbacks from consumers.

#### **Townsmen**

- Receive push notifications about garbage trucks via mobile application
- Receive text messages about garbage trucks via mobile phone
- Observe garbage trucks on real-time map via mobile application.
- Observe garbage trucks on real-time map via web application.
- Give feedbacks on garbage collecting service.

### 1.4 Deliverables.

This section describes the main outputs of the system

This is a web based system. System administrator will get a web based user interface to update the system and observe the truck fleet.

The townspeople will get up to three user interfaces. A website, hybrid mobile application (Android, Windows phone and IOS) and a text messaging service.

### 1.5 Overview of Existing Systems and Technology

This section includes an overview of available existing similar systems and a brief idea about the development of the proposed system.

For now (08/03/2016) there is not a single mobile application related to this phenomena on online application repositories. But there is a web site for tracking garbage trucks in the town of “Rothesay” in Scotland. But the functionalities are limited. People can only view the current locations of garbage trucks that are travelling at a speed of 5 km/h or greater. Only vehicles in movement will be displayed on the screen. It also allows people to review truck history for the previous 2, 4, 12 and 24 hours. Nothing more than these functionalities. [2]

The fleet tracking systems for truck owners are common. But the fleet tracking is only a one functionality in this proposed system. [3]

After the initial requirement gathering and designing phases, I will try to use the new Meteor framework to build a prototype (Using Meteor I can easily build the web and mobile

applications with one code base). If I do not success, I will use Cordova with Ionic to build the hybrid mobile application. And I will have to build a separate web application also. Finally the text messaging user interface using free dialog Ideamart APIs. [4] [5]

## 2 Feasibility Study

### 2.1 Financial Feasibility

*This section provides a description of the financial projections the new initiative is expected to yield versus additional costs.*

The basic costs of the system are as follow: -

Web hosting charges, cost for the GPS tracker per Truck, text messaging subscriptions (for customers)

Economic benefits of the system are as follow: -

The main economic benefit of this system is that the acceleration of the garbage collecting process. Because the waiting time for collecting garbage from each house will be reduced as the people will be prepared in advance for the Trucks. That means the fuel cost for the trucks will decrease in a significant amount.

So the saving of time and fuel cost will benefits the initiative more than the additional costs.

### 2.2 Technical Feasibility

*This section discusses the technical aspects of the system development and indicates whether the project is technically feasible or not. Included about the technologies you are planning to use.*

The administrative access to the system will be given to the Urban Council, Municipal council or Town Council. The system administrator only needs a basic level of computer literacy. Updating truck routes, updating truck departure times and broadcasting special announcements are the only inputs that the system administrator may need to give to the system. And a real-time map of garbage truck fleet, customer feedbacks and summary reports will be the outputs of the system to the administrator. All of above functions will be implemented through understandable simple user interfaces with support instructions. So the system will be technically feasible for the end users. And the mobile application and web application will also be simple and user friendly.

Meteor or MeteorJS which is a series of 100% open source projects (MIT license) that combine to create a complete JavaScript App Platform for full stack reactive app development on mobile and web. So Meteor is the ideal technology to implement a tracking system like this in the market right now. It is a reactive, cross platform framework. So it saves the additional cost of developing separate code bases for different platforms like Android, IOS and Web.

This technology is way more mature enough to develop the system. It has 10258 packages, 105 Professional service providers, 508K unique installs, 19913 stack overflow

questions right now for 21<sup>st</sup> of March 2016. [6] The Meteor's dedicated support team is standing by to resolve critical issues 24x7x365, with guaranteed response times as short as 15 minutes for customers on their Enterprise plan. They can support through the entire lifecycle of the system from design and development, through operations and maintenance. [7]

To implement the text messaging user interface, ideamart is a mature enough technology. The Dialog Ideamart Team is always there to help any party who requires clarifications with regard to the Ideamart platform and its offerings. [8]

So the main technologies – Meteor and ideamart will ensure the technical feasibility of the project.

### 2.3 Resource and Time Feasibility

*This section describes specific hardware and software requirements / resources and time feasibility for the successful completion of the system development.*

As “The Needs for the Project” section elaborates, people will get perfect solutions from a system like this. And currently there are no other similar systems on the market (in Android Play Store or Apple iTunes).

The only alternative web solution has only one functionality of the proposed system (Only can view the current positions of trucks on a map) which is not enough to satisfy the current user requirements.

So this will be a popular system among the society as an appropriate solution to the garbage problem in urban areas.

No special integrated development environment (IDE) is needed for developing this system using Meteor. Meteor also supplies a free hosting service under “.meteor.com” domain for developing purposes. So no hosting costs while developing. For the real world testing purposes, at least one GPS tracking device should be supplied. [9]

### 2.4 Risk Feasibility

*This section describes the risks and risk mitigations*

There is a risk that people may not be motivated enough to use the text messaging user interface as it costs a monthly subscription fee. But the people can be motivated by following procedure.

As this system can increase the productivity of the Urban Council, Municipal council or Town Council, the councils can introduce this system to the tax payers as an annual tax acquiring discount. The entire or a partial subscription fee of a following year can be paid for the tax payer by the council as a discount of paying tax in time. Like that the risk can be mitigated while providing extra benefits to both the end users.

Most of the users of this system will be housewives. So every one may not have smart phones. This risk will be mitigated via the text messaging user interface.

## 2.5 Social/Legal Feasibility

Some labourers including the truck drivers will not be happy with the new system because of the customer feedback feature. There will not be any chance to take bribes also. So there is a risk that truck drivers will rally against the new system. But proper acknowledgement to people about the system will reduce this risk.

The fear to use new technology can also effect the deployment of the system. But as the garbage collecting service is among the urban areas, the probability to have more literacy on technology is higher.

## 3 Considerations

*This section describes the primary concerns related to this project indicating the most important aspects/features of the system.*

As a system with the main functionality of real-time location tracking, the performance is a vital aspect of the system. So the lagging of the location detection and update should be low. As Meteor can give an “Optimistic User Interface” using web sockets, the performance of the system will be significantly higher. [10]

The security of the system is also a primary concern. This can be defined as an information distribution service. So faultless should be preserved to maintain the trust of the consumers of the system, otherwise the system will be useless eventually. And also because of the consumer feedback service, the security is important.

The usability is the next most important concern of the system. If not, the overall benefits from the system will be not as much as expected. So to increase the usability, the system will be available for windows, Linux, Mac, Android, IOS and basic mobile phone users. Developing on the cross platform framework Meteor, will facilitate deploying the system on all above platforms. So the usability of the system will be at a higher state.

## 4 References

- [1] D. G. -. H. B. School, “Working Knowledge,” Harvard Business School, 29 Oct 2012. [Online]. Available: <http://hbswk.hbs.edu/item/are-you-paying-a-tip-or-a-bribe>
- [2] T. o. Rothesay, “Garbage / Compost & Recycling Truck Tracker,” 2012. [Online]. Available: <http://www.rothesay.ca/operations/garbage-compost-and-recycling-truck-tracker>
- [3] T. Mobile, “TSO Mobile,” 2015. [Online]. Available: <http://www.tsomobile.com/mobile-apps.html>.
- [4] “Meteor,” [Online]. Available: <https://www.meteor.com/>
- [5] “Ionic Framework,” [Online]. Available: <http://ionicframework.com/>
- [6] “Meteor,” 2016. [Online]. Available: <https://www.meteor.com/>
- [7] “Meteor,” 2016. [Online]. Available: <https://www.meteor.com/galaxy>

- [8] “Ideamart,” [Online]. Available: <http://www.ideamart.lk/about-us>
- [9] “Amazon.com,” [Online]. Available: [http://www.amazon.com/Flashmen%C2%AE-Vehicle-Motorcycle-Tracker-Tracking/dp/B0159T3L70/ref=sr\\_1\\_8?ie=UTF8&qid=1458517141&sr=8-8&keywords=Mini+GSM+GPRS+GPS+Tracker+Vehicle](http://www.amazon.com/Flashmen%C2%AE-Vehicle-Motorcycle-Tracker-Tracking/dp/B0159T3L70/ref=sr_1_8?ie=UTF8&qid=1458517141&sr=8-8&keywords=Mini+GSM+GPRS+GPS+Tracker+Vehicle)
- [10] “Meteor,” 2016. [Online]. Available: <http://info.meteor.com/blog/optimistic-ui-with-meteor-latency-compensation>