

1 Introduction

This document proposes a system to encourage car-pooling in Cairo as a way to reduce traffic congestion on selected roads during selected time-frames. Cairo traffic has been worsening for the past 2 decades and building/expanding roads has proven to be insufficient in facing the increasing number of cars.

Cairo is also suffering from high and increasing levels of pollution of which traffic is a major source.

Reducing traffic congestion is likely to have positive national impact of reducing consumption (import) of petroleum and import of spare parts which in most cases requires foreign currency.

Other impacts in terms of reduction of Noise, Stress and Commuting (wasted) labour-time are also highly likely to happen as result of reducing traffic and its congestion.

2 Solution architecture

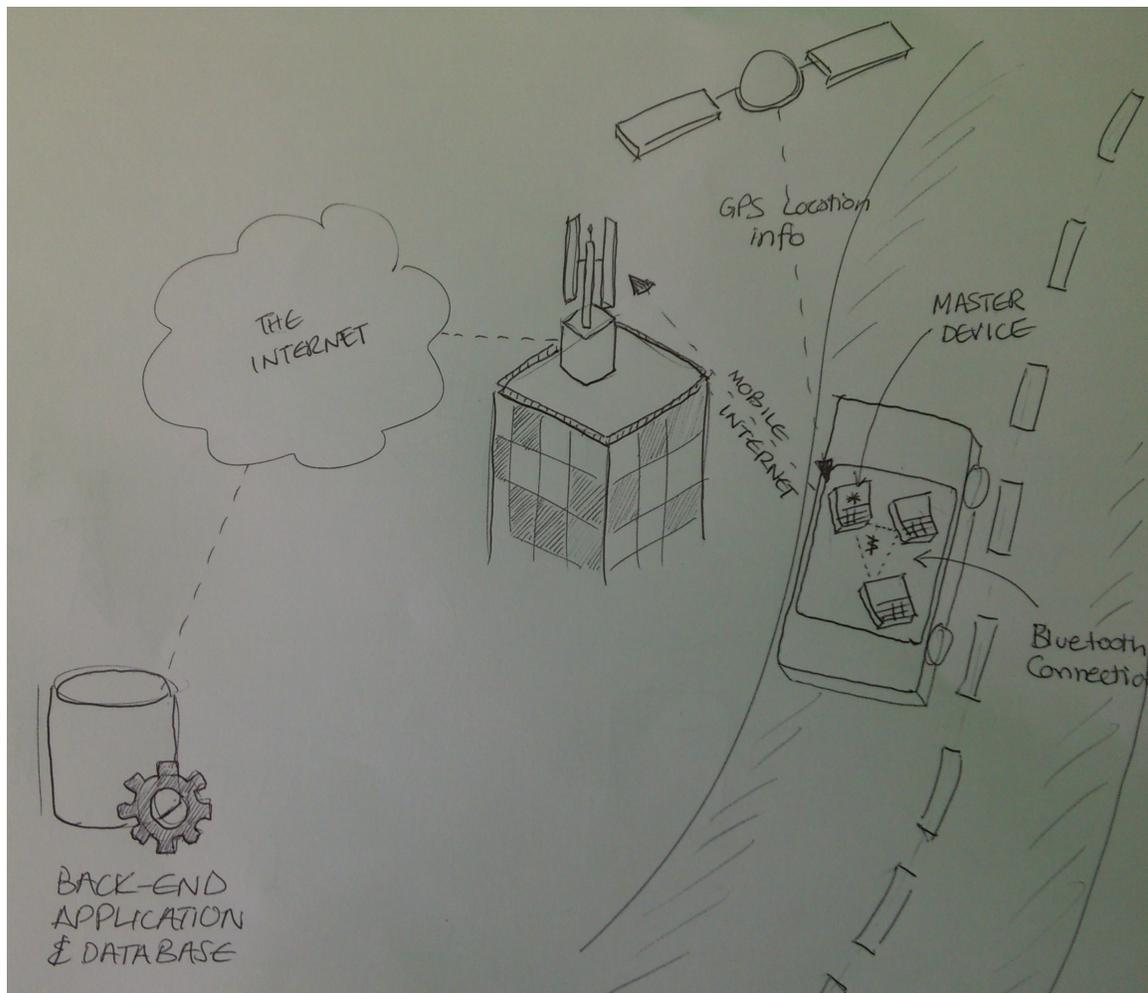
2.1 Overview

The objective is simply to track commuting cars and passengers and offer incentives for carpooling (two or more passenger using one car) on specific roads and time-frames.

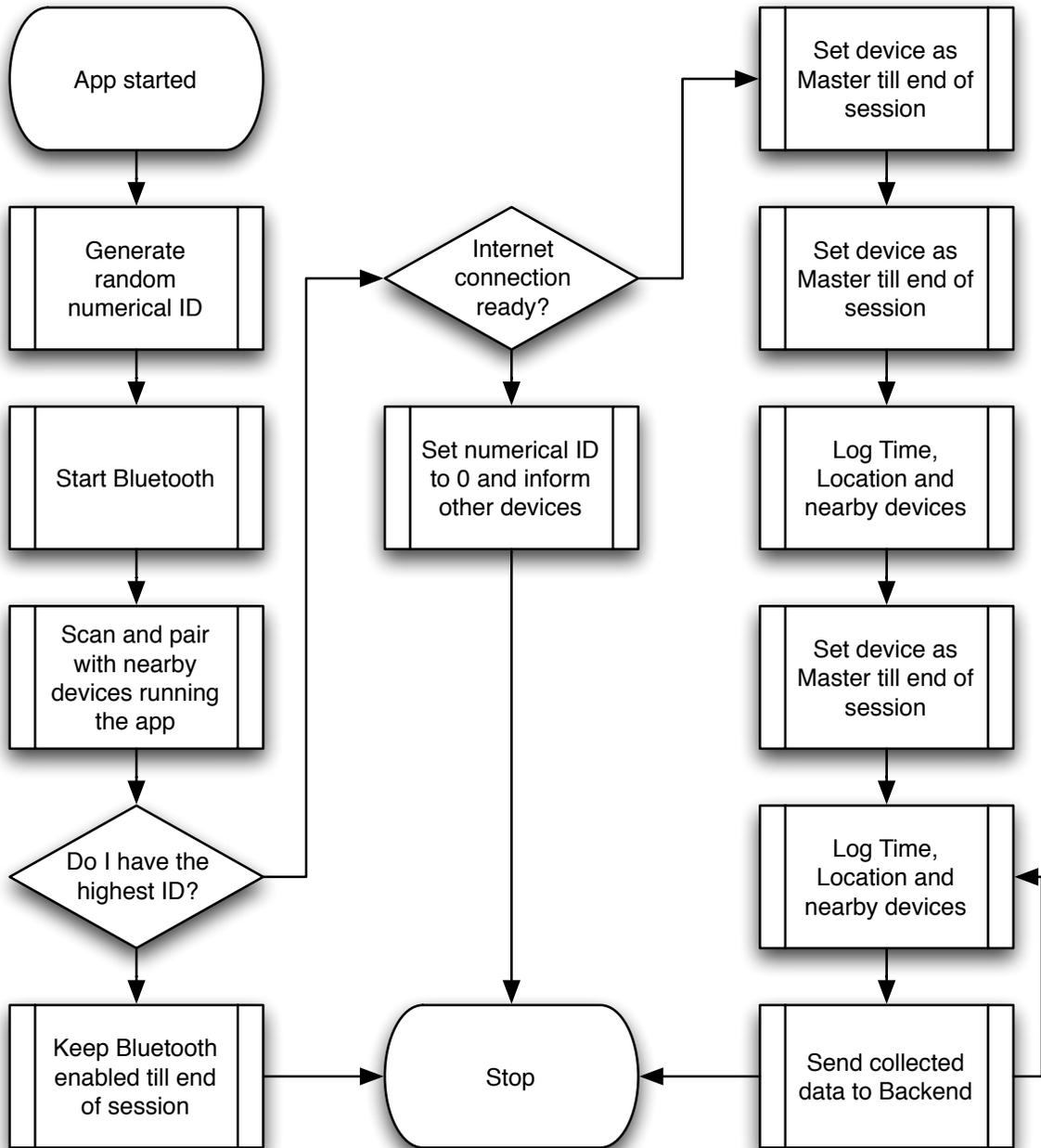
To do this, we will rely on technologies in passengers smart phones, as an affordable alternative to infrastructure like automated zero-delay toll-gates.

From a high level, we will use Bluetooth to detect the proximity of different passengers to each other (sharing a car), GPS to track distance/time travelled on target roads/times and GPRS (mobile internet) to send collected information to a central database.

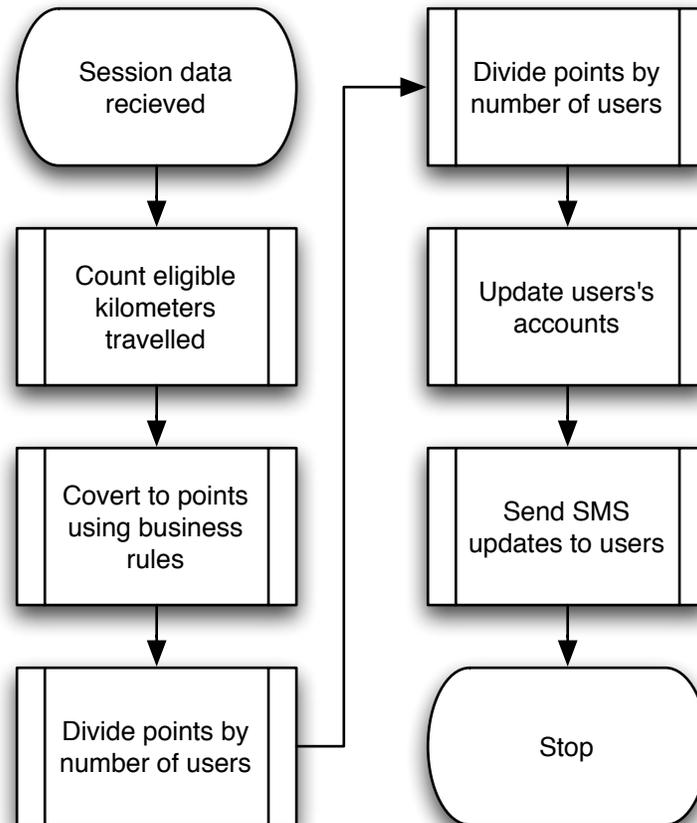
A gamified system offering game-like incentives will be the foundation for different kinds of incentives. For example, where possible, points earned on the system for carpooling can be exchanged for material benefits like cash, discounts or vouchers.



2.2 Mobile app



2.3 Back-end



2.4 Gamification

A balanced and attractive game-like system will be used as the foundation for all offered incentives. When building such a system, it's important to identify and keep track of the targeted behaviors that we want to motivate. This is especially important in a gamified system because of two reasons. The first reason is that games become very discouraging if rules are changed too often or too much.

And the second reason is that gamification works on internal motivation whose power can be a double-sided sword. If you end up motivating the wrong behaviors they can be hard to change. For example, if offer too much incentive for carpooling on the congested routes, we might end up encouraging carpooling commuters to prefer the congested routes and use it making it more congested.

2.4.1 Points conversion formula

After some research, the following formula was fund to ecourage the right target behaviour.

$PM \cdot \text{Sum}(d \cdot SLF \cdot CF)$ where,

PM = Points multiplier which can be tuned to reward persistently performing members.

d = The unit of distance (say 2Km) that will be evaluated separately considering

the different congestion levels on any commute.

SLF = Speed Loss factor which is Current Speed divided by 60Km/hr.

CF = Congestion factor which is different per route or route section.

3 Budget

The following items constitute the major spending areas. The following are rough estimates for Establishment/First year budgets. My estimated total is \$1 14,000 for establishment and \$144,000.

3.1 Development (Mobile/Web/Database)

\$72,000 / \$36,000

3.2 Setup (Hardware/Software/Cloud service)

\$6,000 / \$12,000

3.3 Marketing

\$36,000 / \$36,000

3.4 Operations

\$0 / \$36,000

3.5 Incentives (non-monetary)

\$0 / \$10,000

3.6 Incentives (monetary)

\$0 / \$24,000

4 Financing

There are many stakeholders who will benefit from reducing traffic and congestion in Cairo. As a result financing can come from many different sources. We will split the needed financing into three phases. Establishment (done by founders), Operating for the first year (done by builders) and then we will hopefully be able to self finance.

4.1 Crowd financing (monetary)

Founders will share the establishment cost. In return they will get the following:

- A unique badge and the right to use it to demonstrate this major contribution.
- An ongoing semi-annual report on performance and achievements.

Builders will share the operating cost of the first year. In return, they get the following:

- A unique badge and the right to use it to demonstrate this major contribution.

4.2 Crowd financing (data)

All members will get a small amount of points for keeping the app running on the target routes/times. This will provide us with valuable data. For example, how many solo drivers started to carpool and also will give us statistics on average speeds so we can create a baseline and evaluate improvements if any.

4.3 Corporates

This can be a good option for Corporate Social Responsibility initiatives. In return, we can offer the following:

- Logo on our site and reports as sponsors.
- Special sticker for carpooling employees showing company logo.
- Connection between our points and their internal HR points system if beneficial.
- Run carpooling competitions between corporates and report on savings.

4.4 Local NGO

In return for financing, we can offer coined marketing on a certain amount of car stickers.

4.5 International NGO

We can seek funding from global environmental initiatives for reducing CO₂ emission or limiting disposition of used oil/parts. We can also make use of funds targeting reduction of fossil fuel consumption.

4.6 Government

This is challenging but, if done will need a good RoI analysis including what the government spends on subsidizing petrol/gasoline and.

4.7 Selling traffic data

After a reasonable amount of data is collected, hopefully by end of first year, we can offer access to this data for monetary returns.