Traffic Wizard

Personalized Traffic-monitoring SmartPhone app

Outline

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- Heavy Traffic Factors
- Traffic Wizard Solution
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- Market Analysis
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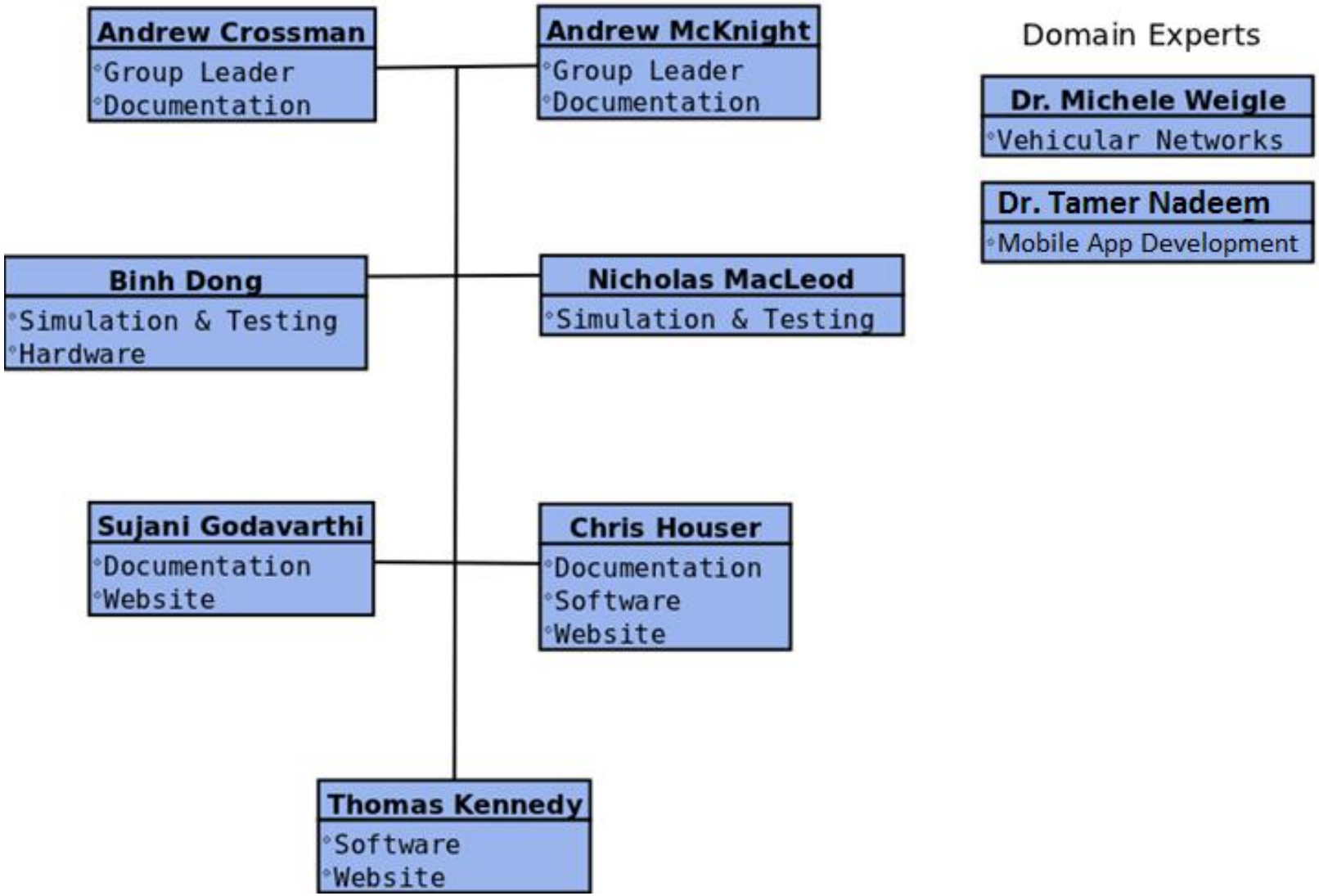
- Return-On-Investment
- Risk Assessment
- Work Break Down Structure
- Phase 2 Staffing Chart
- Phase 2 Hardware Requirement
- Conclusion

Team Blue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Group Leader
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Website
Chris Houser
Documentation
Software
Website
Thomas Kennedy
Software
Website

Societal Problem

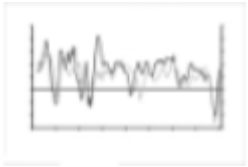
A driver's limited awareness of adverse road conditions increases their potential to get caught in heavy traffic congestion.

Congestion Factors

Heavy Traffic Avoidance

Visual Cues
- Time of day
- Weather
- Geography / Obstacles
- Reaction time

Experience/ Patterning
- Available time



Media
- Coverage
- Latency
- Availability/Access
- Reliability

GPS
- Connectivity
- Error prone
- Access

Word of Mouth
- Availability
- Reliability

Traffic Cameras
- Coverage
- Outage
- Timely access

Mobile Apps
- Distraction
- Reliability of sources
- Availability / Access

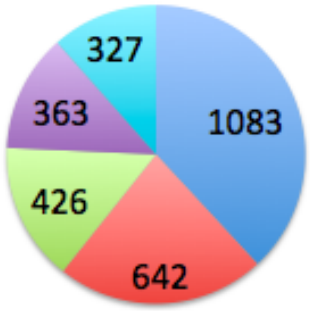
Solution

Goals

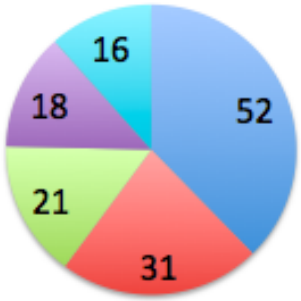
Traffic Wizard is a traffic analysis smartphone app, personalized for each driver, to inform them of route-specific traffic conditions before they get caught in heavy traffic. The app will feature:

- Accurate traffic information distribution based on custom routes
- Profile system to store frequent routes for pre-analysis before travel time
- Virtual checkpoint system for efficient data transfer during traffic updates.

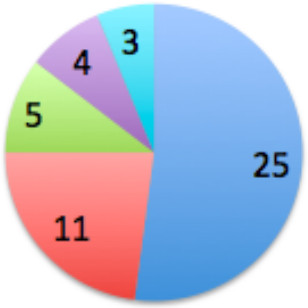
U.S. Traffic Data (per driver, per year)



Aggregate Cost, as calculated from fuel and delay excesses
(dollars)



Average Hours Delayed



Average Fuel Excess, due to longer commute times

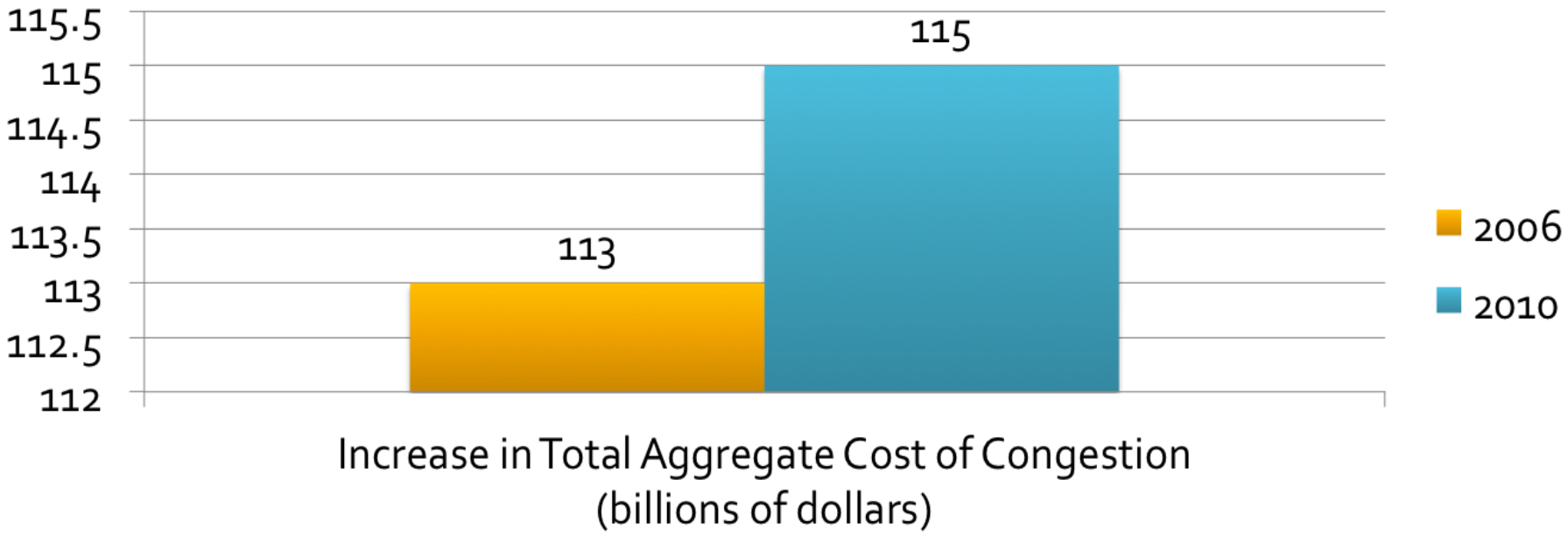
Legend of population sizes

Very Large Areas	Large Areas	Medium Areas	Small Areas	Other Urban Areas
> 3,000,000	> 1,000,000	> 500,000	< 500,000	

*Source: Texas Transportation Institute

U.S. Traffic Trends

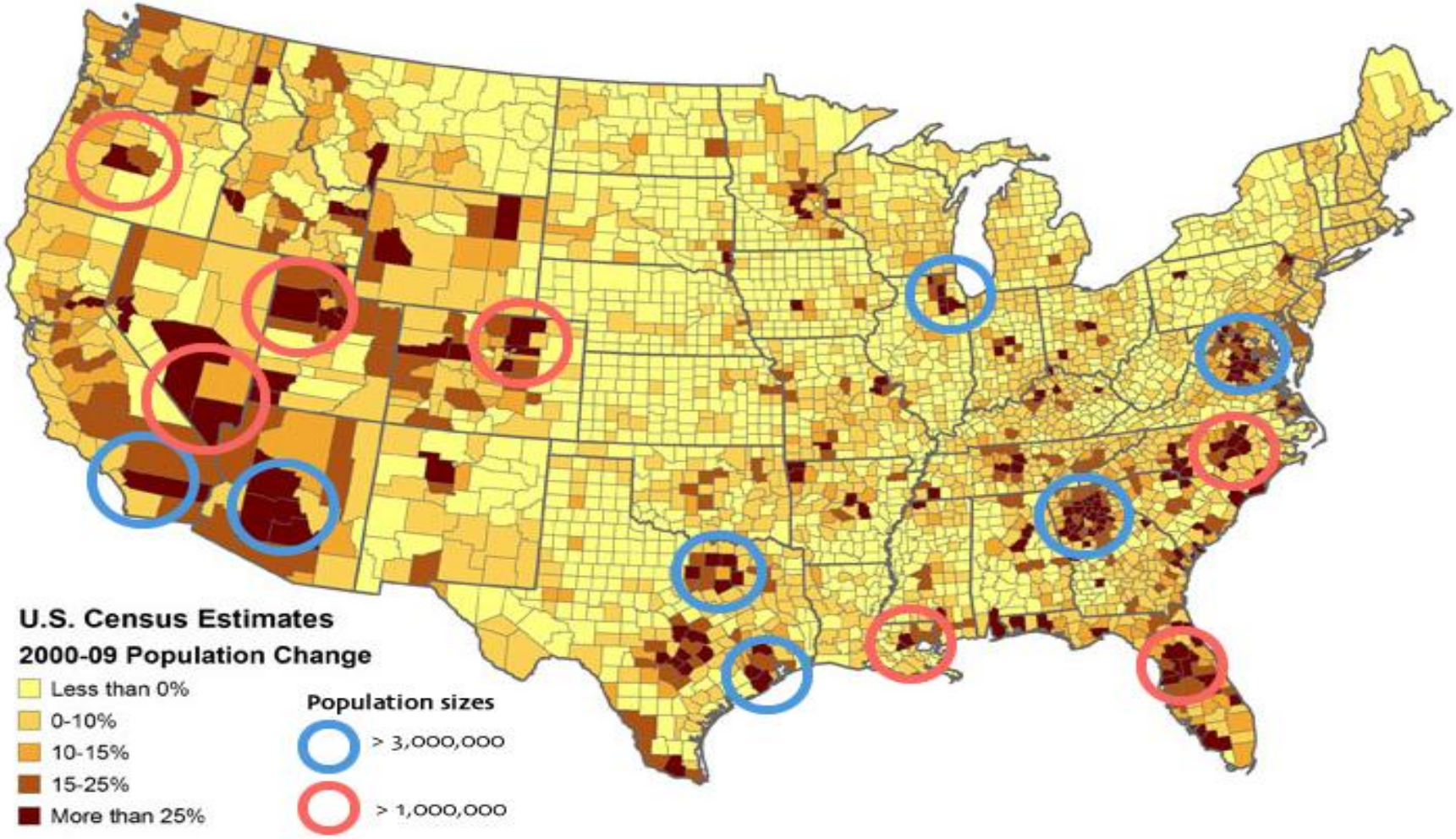
- 4.8 billion hours of excess commute time
- 1.9 billion gallons of excess fuel consumed
- $100.9 billion aggregate from fuel and time lost (from salary and other opportunity cost)



*Source: Texas Transportation Institute

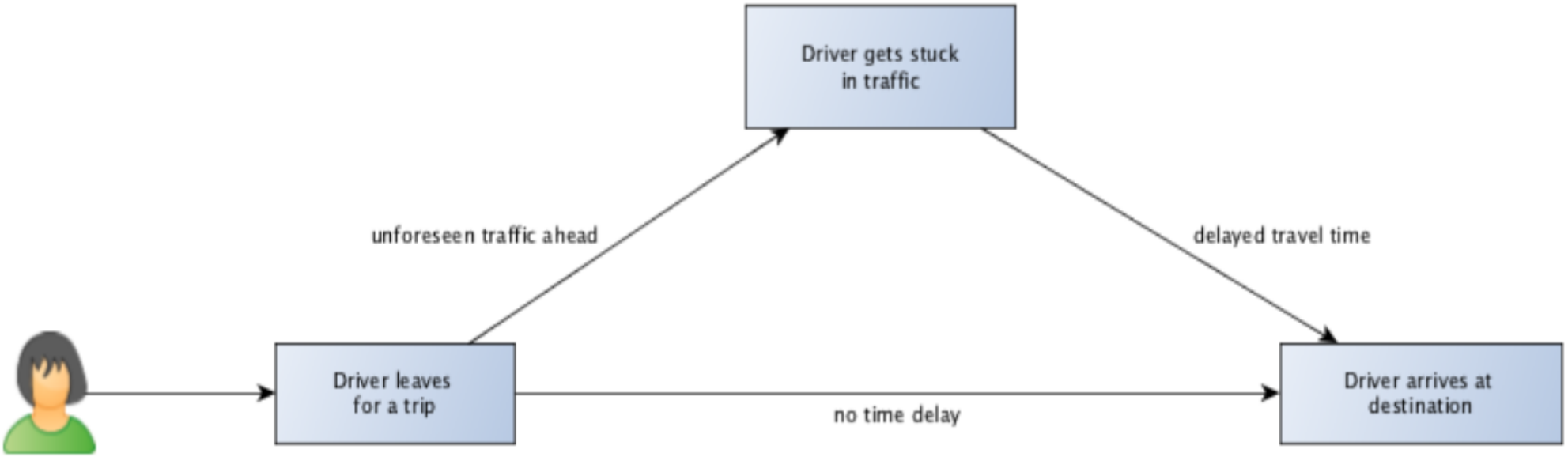
U.S. Population Trends

- The highest congestion cost is incurred in areas with large populations.
- Populations are increasing the fastest in these high population areas.



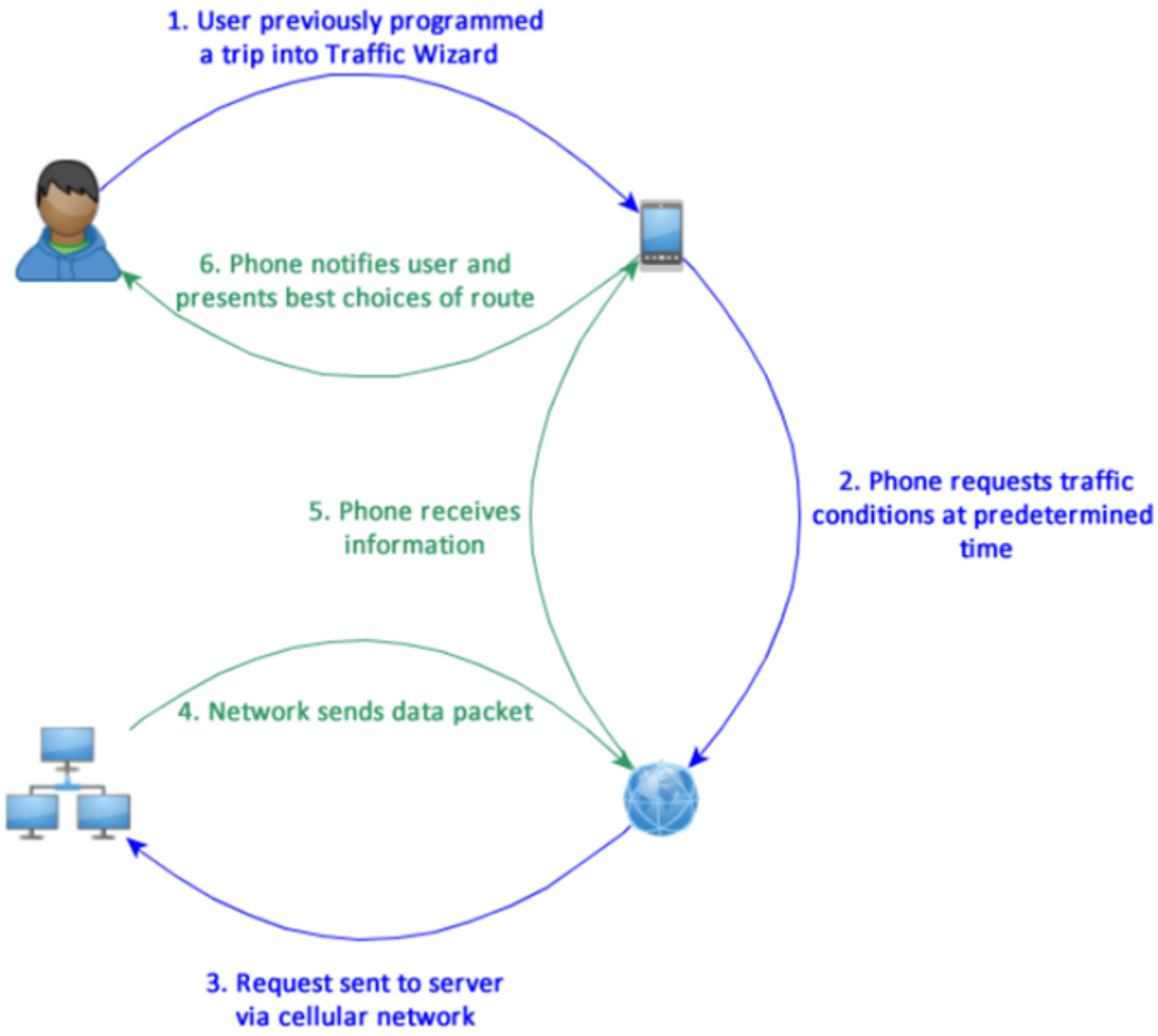
*Source: Texas Tribune and Texas Transportation Institute

Without Traffic Wizard

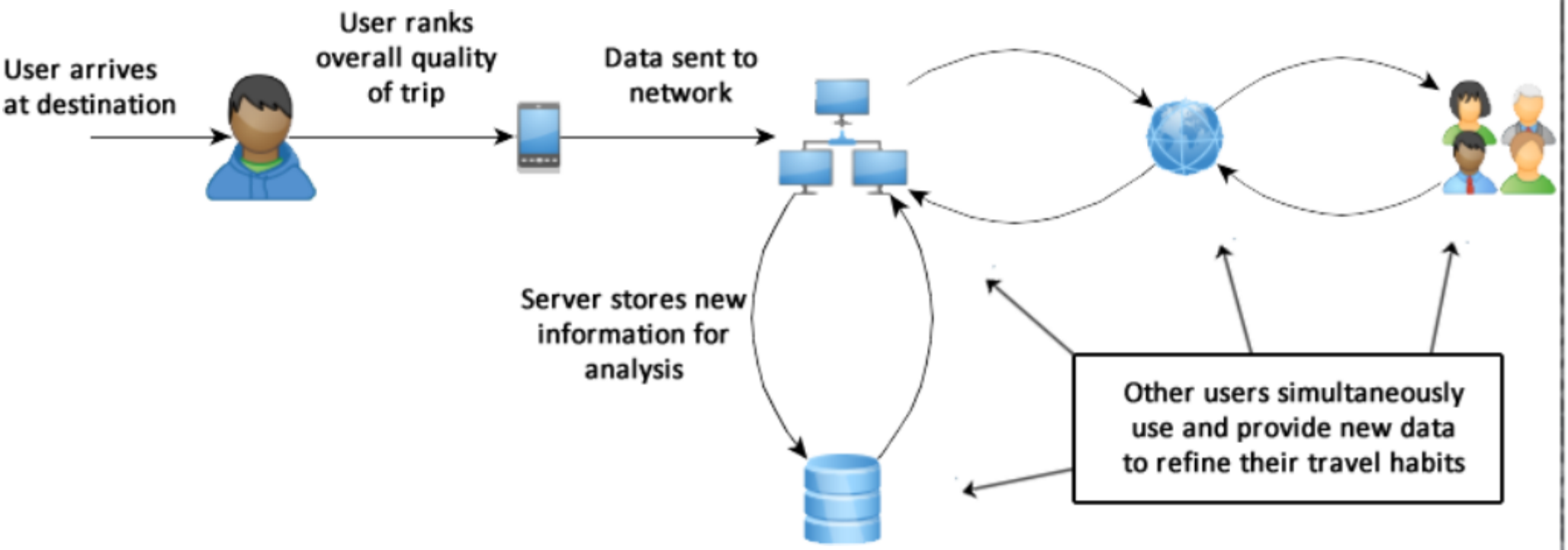


With Traffic Wizard: Gathering Data

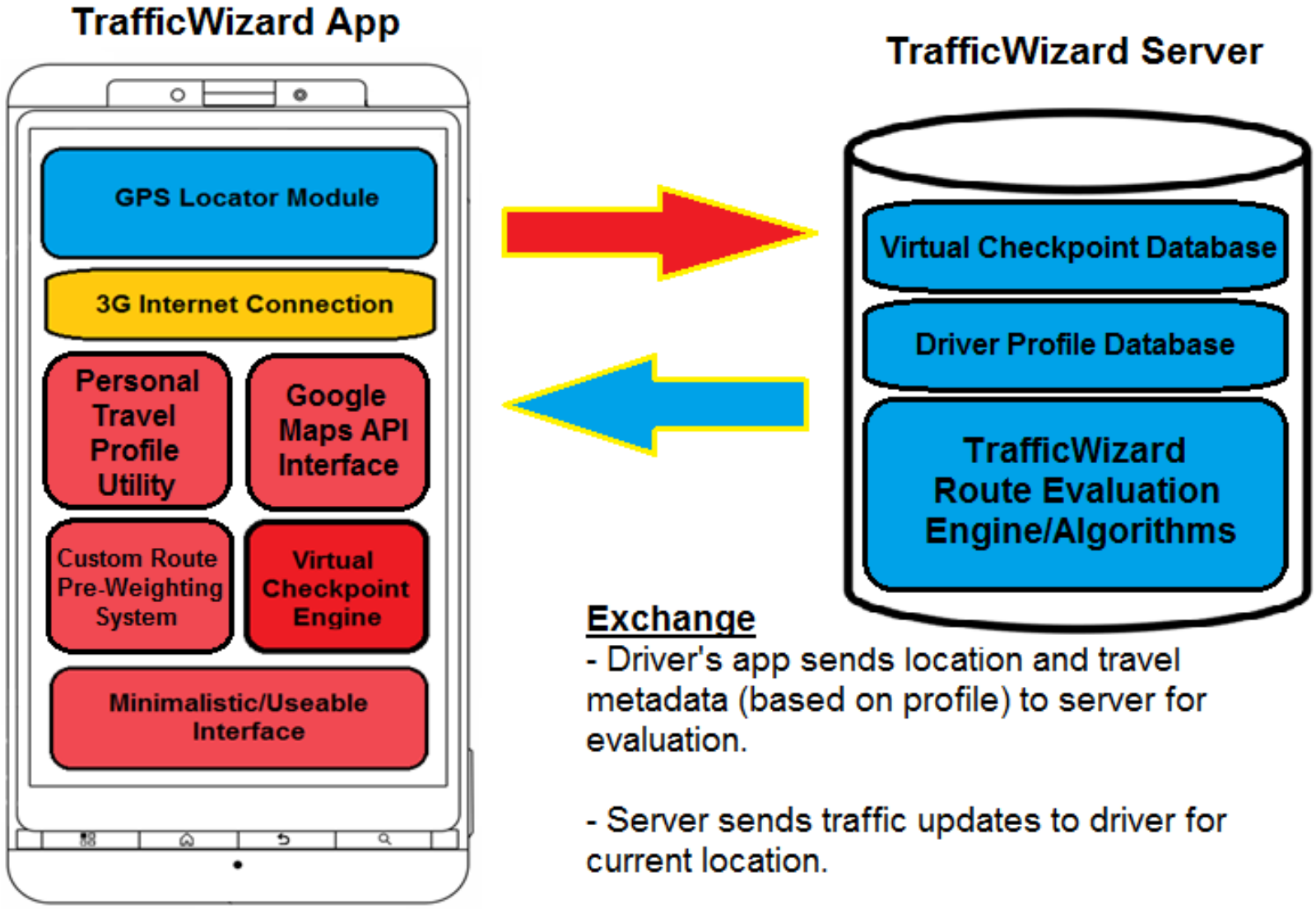
With Traffic Wizard: Decision Making



With Traffic Wizard: Constant Refinement



Major Functional Components

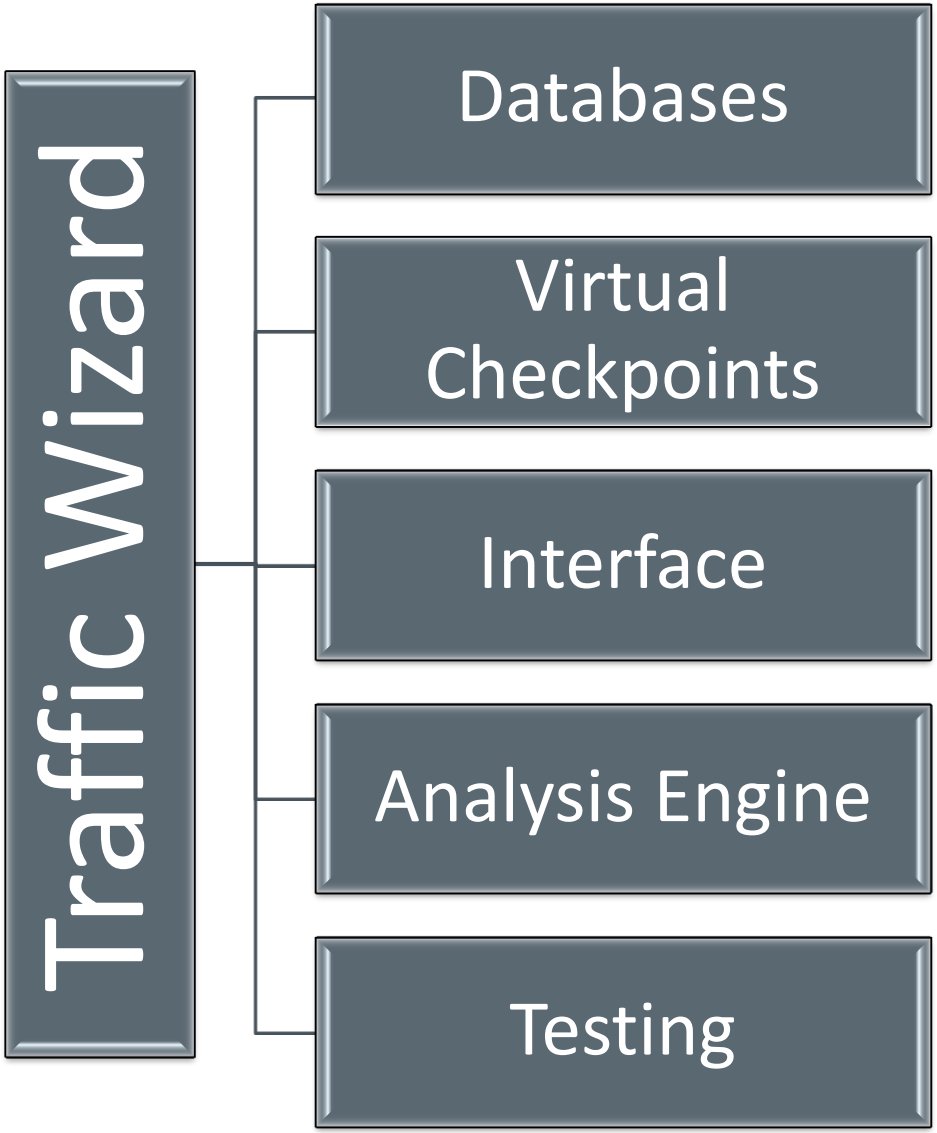


Exchange

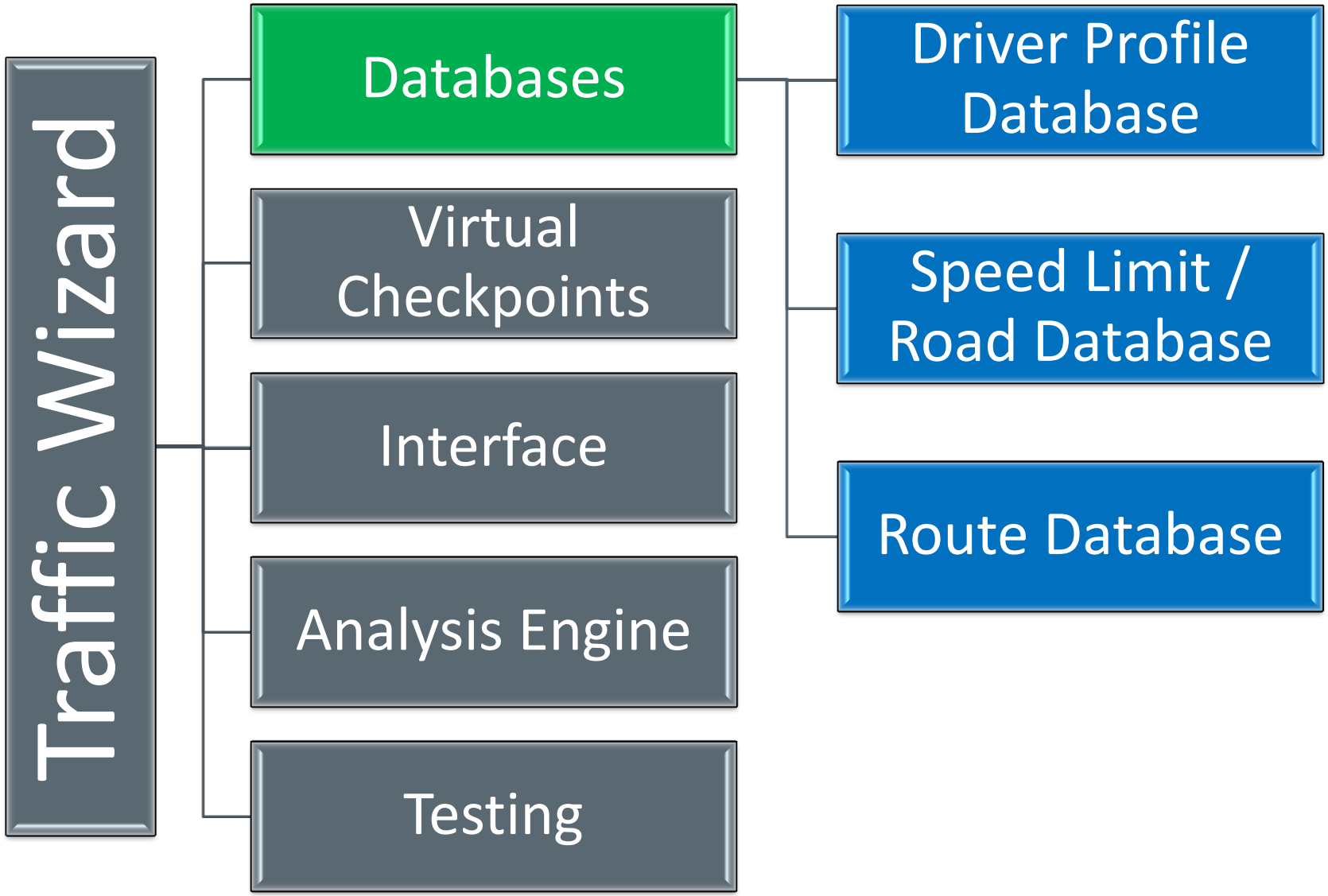
- Driver's app sends location and travel metadata (based on profile) to server for evaluation.

- Server sends traffic updates to driver for current location.

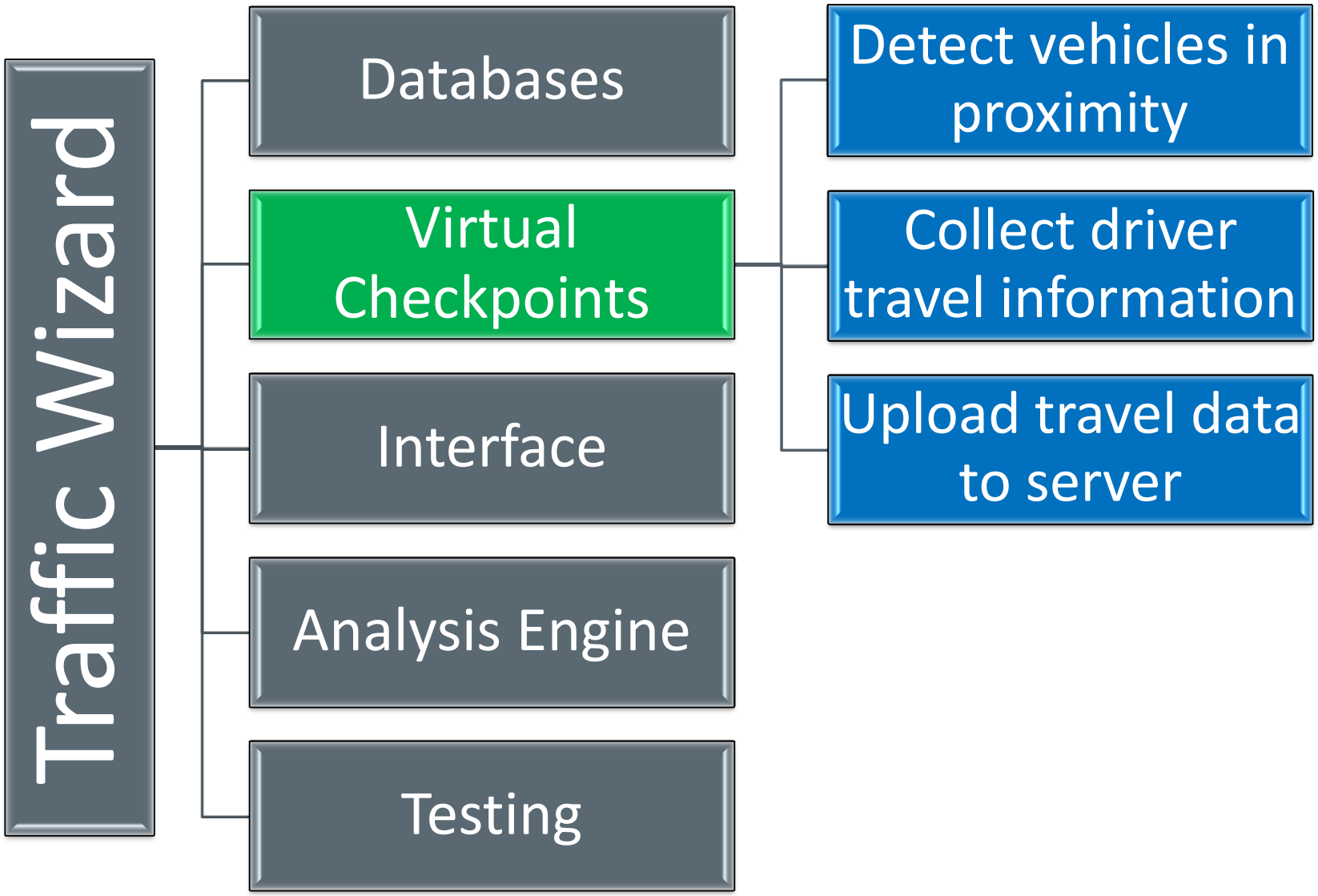
Software Milestones



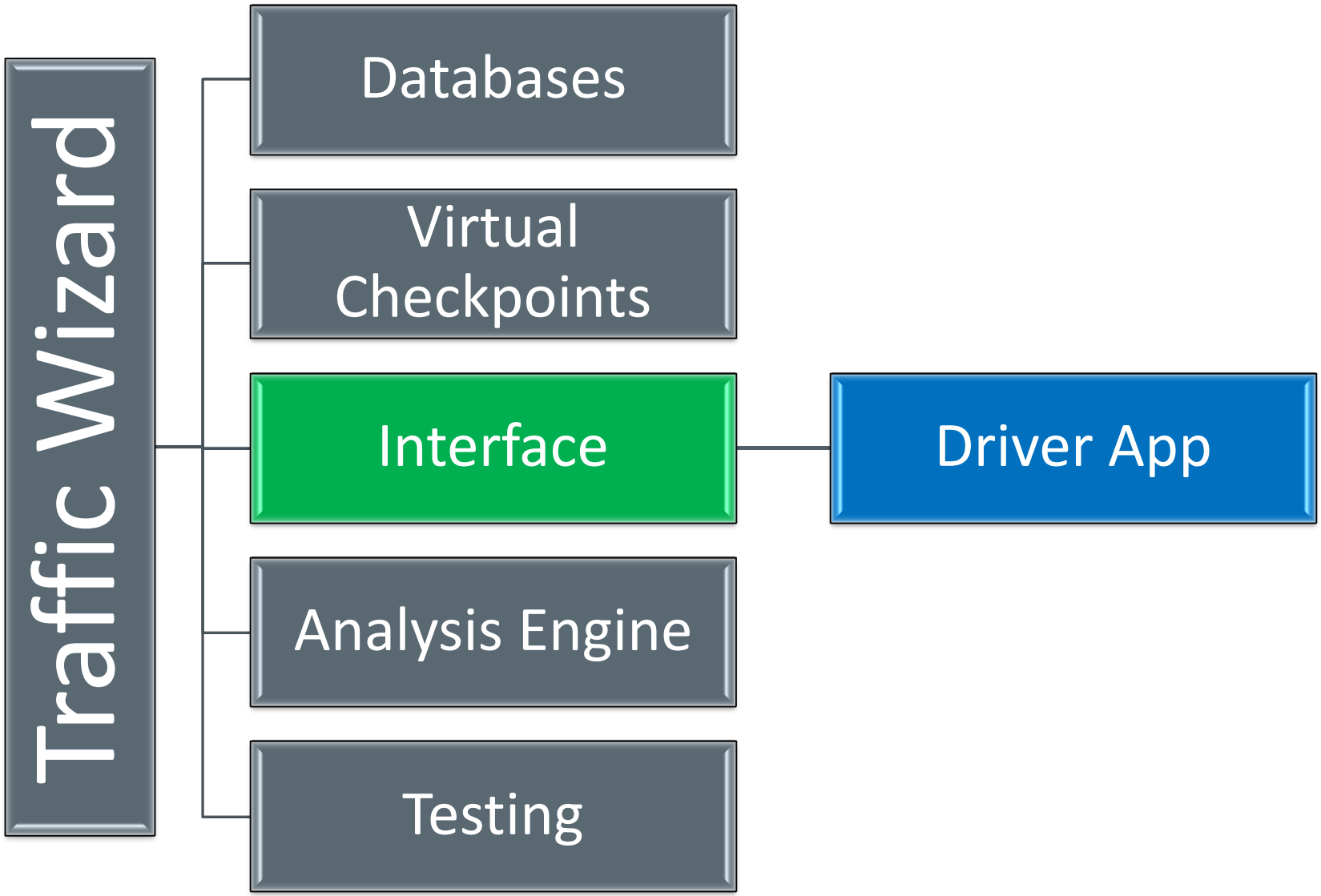
Software Milestones: Databases



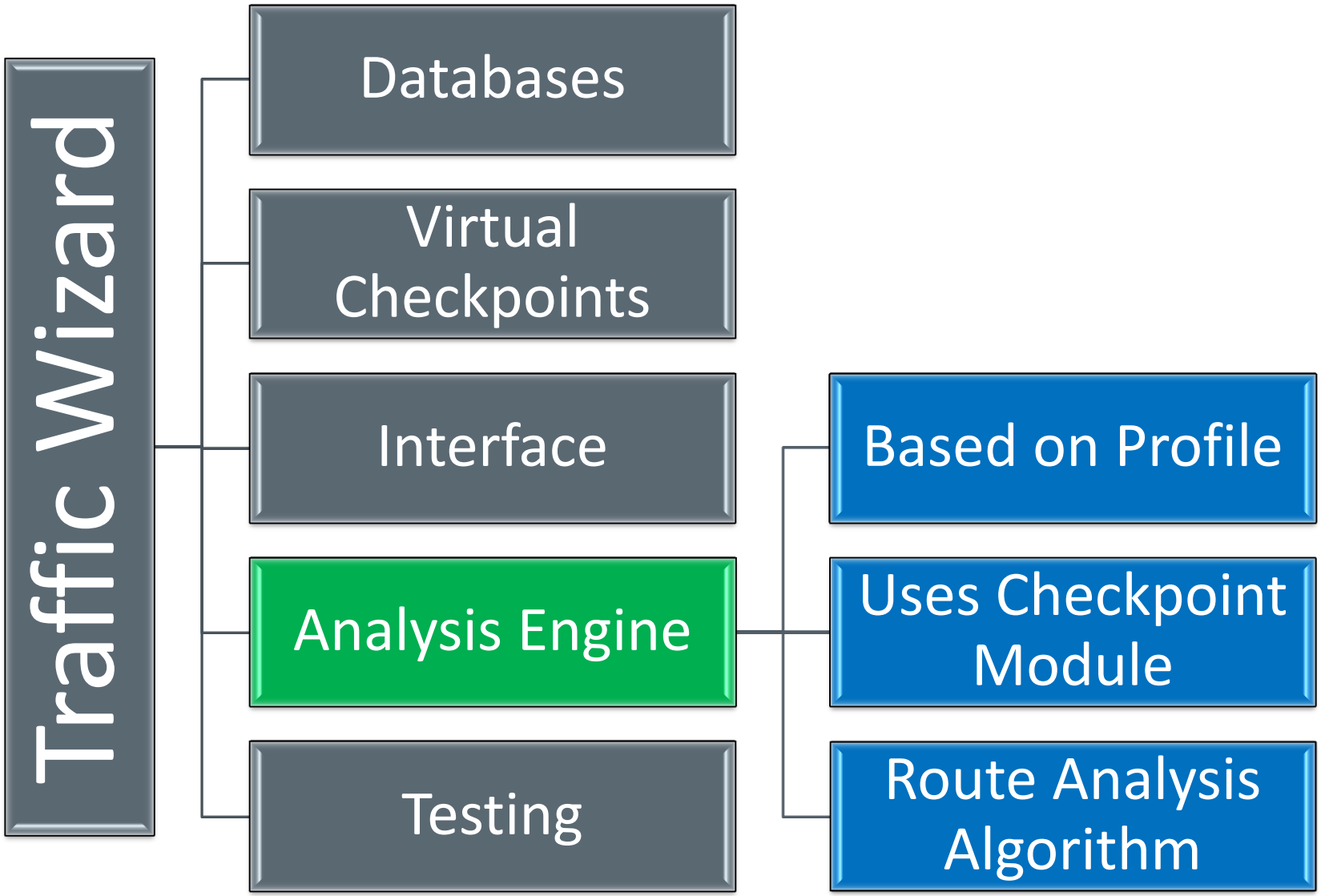
Software Milestones: Checkpoints



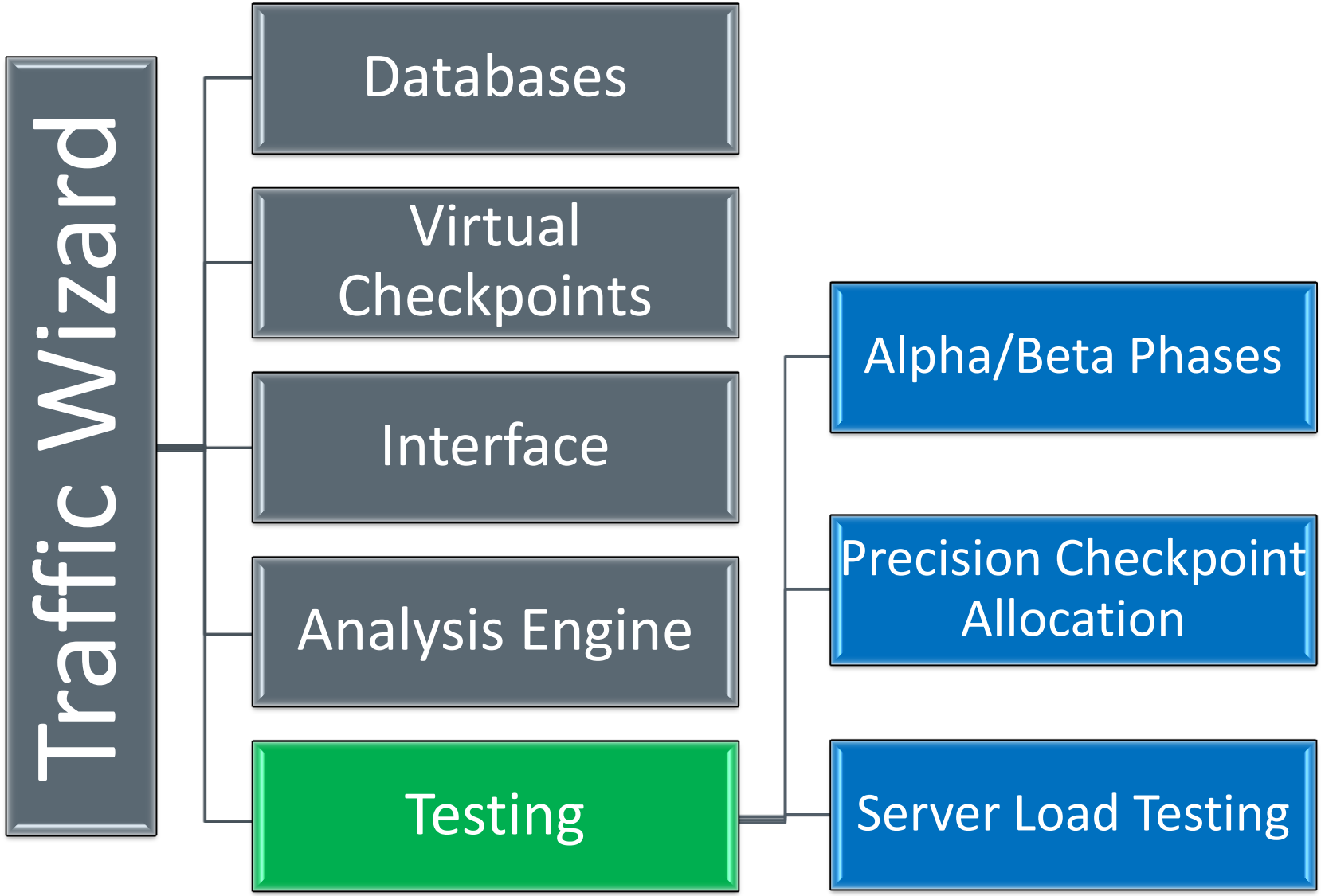
Software Milestones: Interfaces



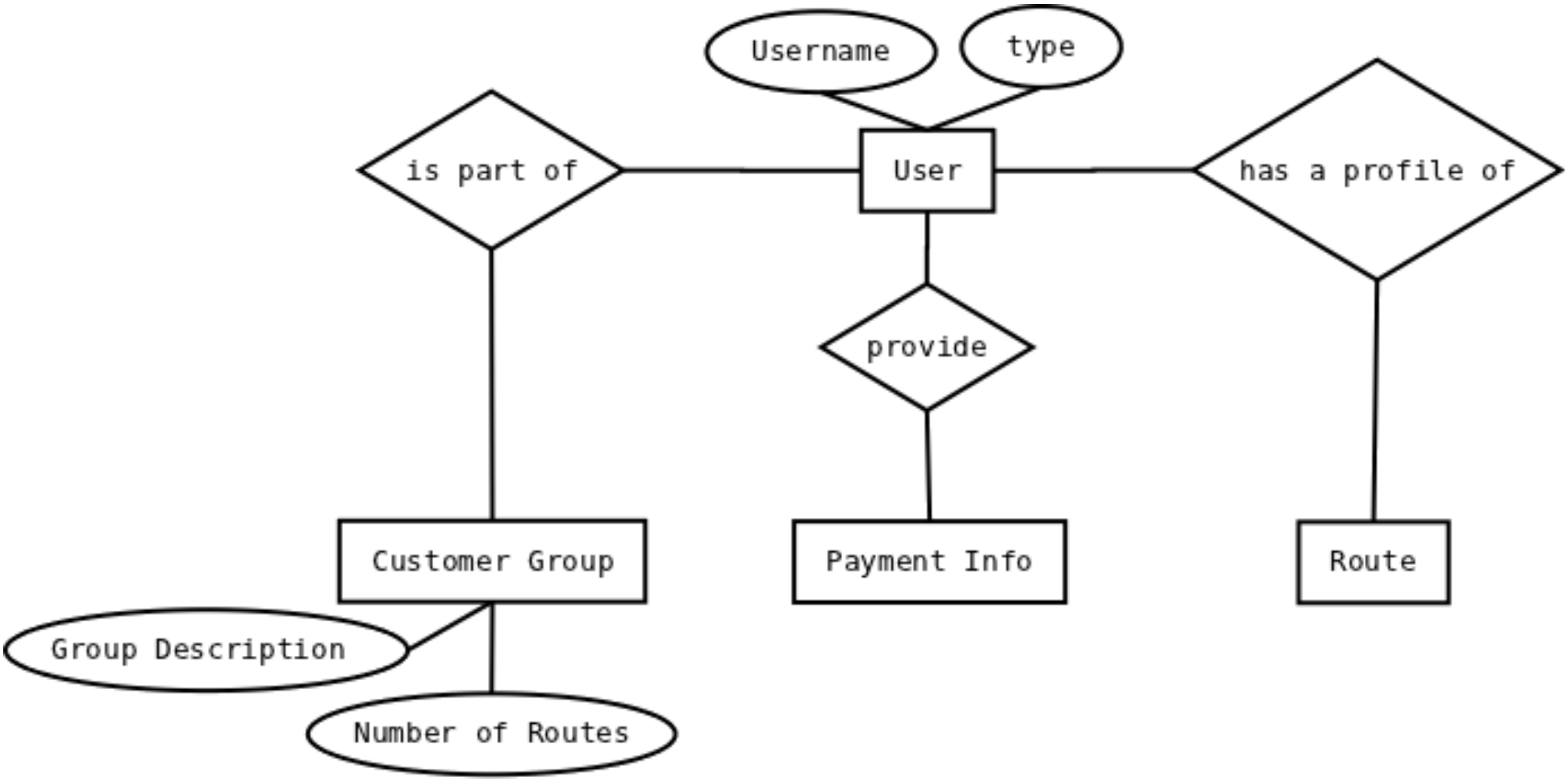
Software Milestones: Analysis



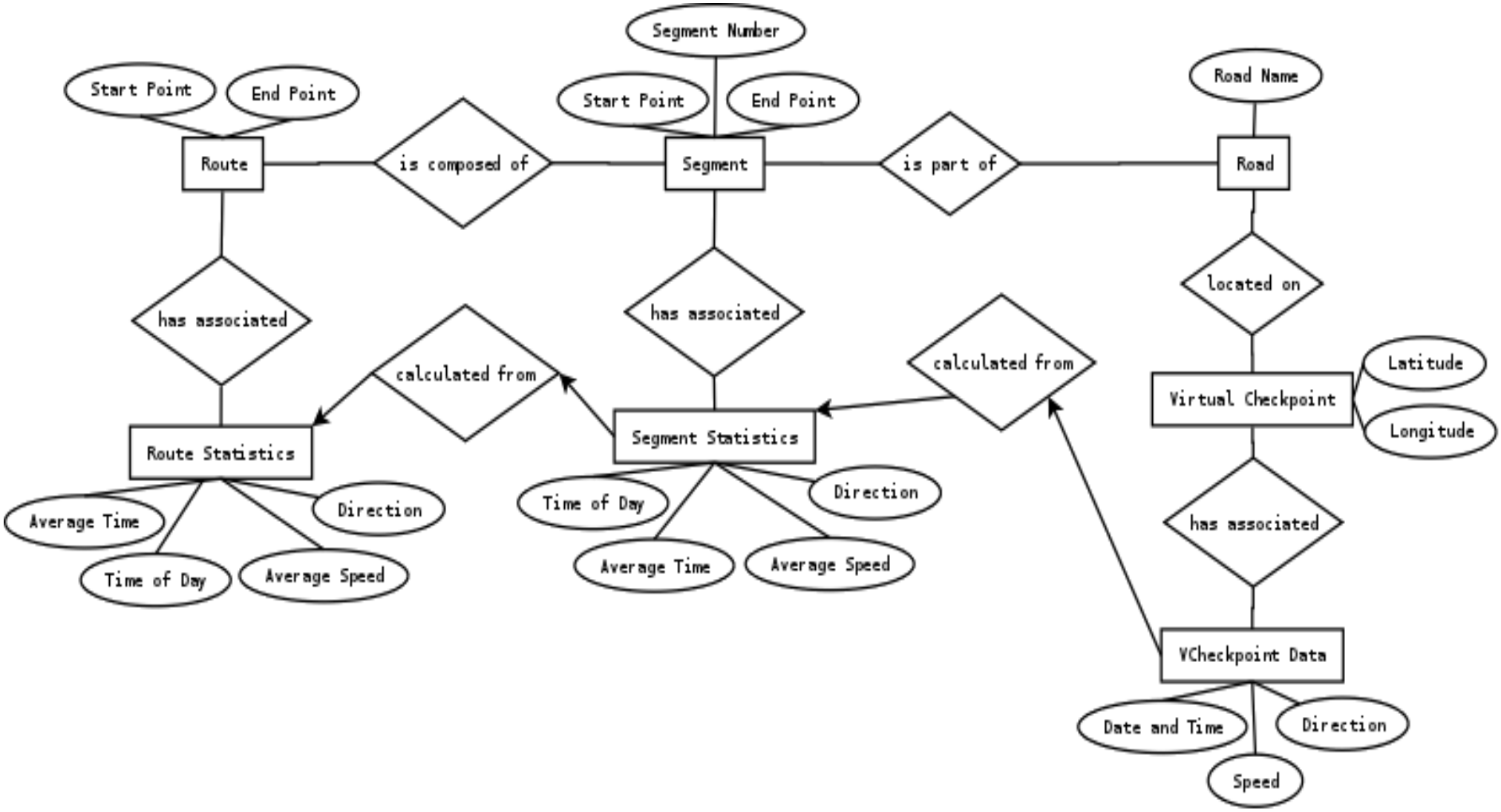
Software Milestones: Testing



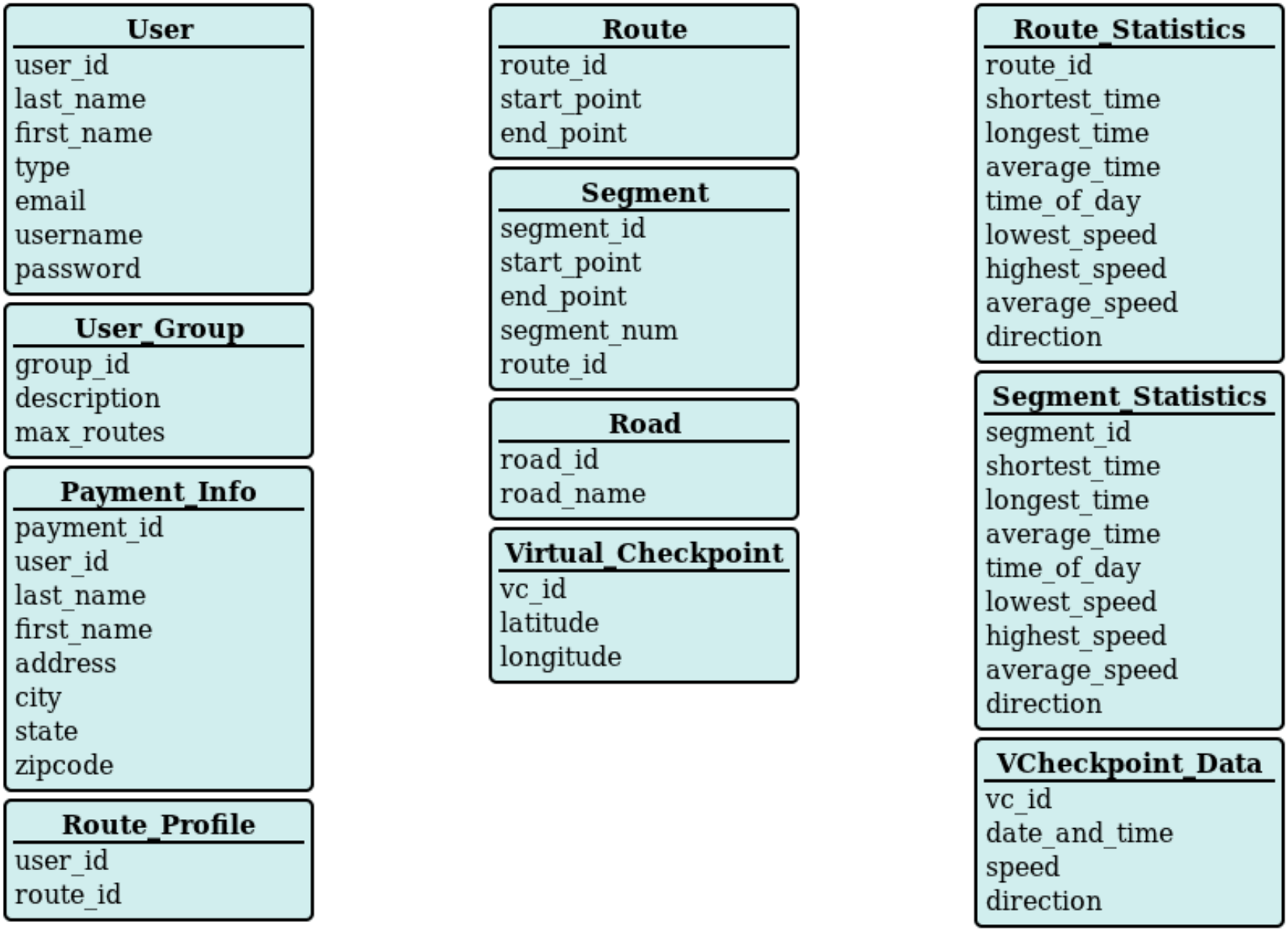
Customer Database



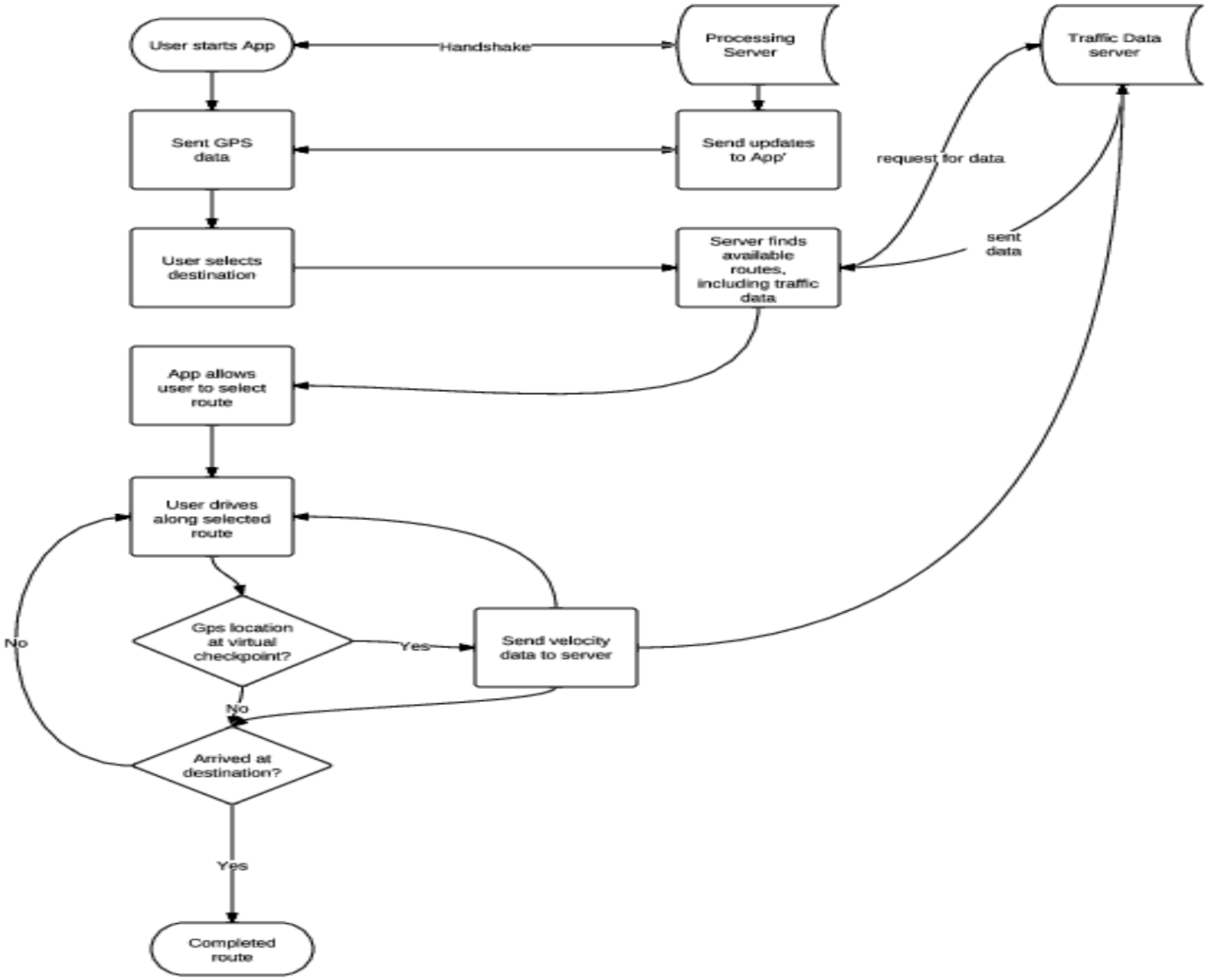
Route Database



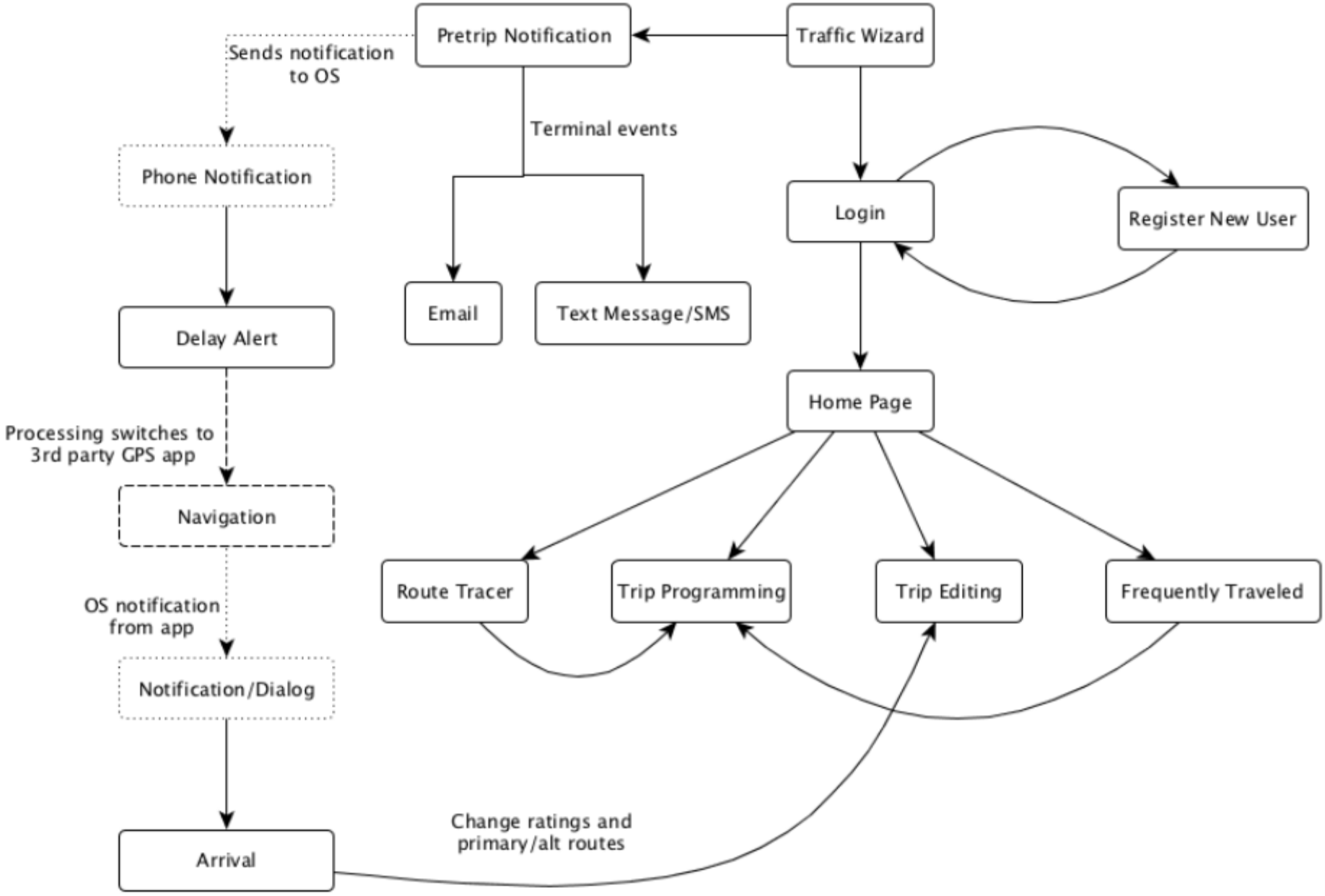
Entities


User
user_id
last_name
first_name
type
email
username
password
User_Group
group_id
description
max_routes
Payment_Info
payment_id
user_id
last_name
first_name
address
city
state
zipcode
Route_Profile
user_id
route_id
Route
route_id
start_point
end_point
Segment
segment_id
start_point
end_point
segment_num
route_id
Road
road_id
road_name
Virtual_Checkpoint
vc_id
latitude
longitude
Route_Statistics
route_id
shortest_time
longest_time
average_time
time_of_day
lowest_speed
highest_speed
average_speed
direction
Segment_Statistics
segment_id
shortest_time
longest_time
average_time
time_of_day
lowest_speed
highest_speed
average_speed
direction
VCheckpoint_Data
vc_id
date_and_time
speed
direction

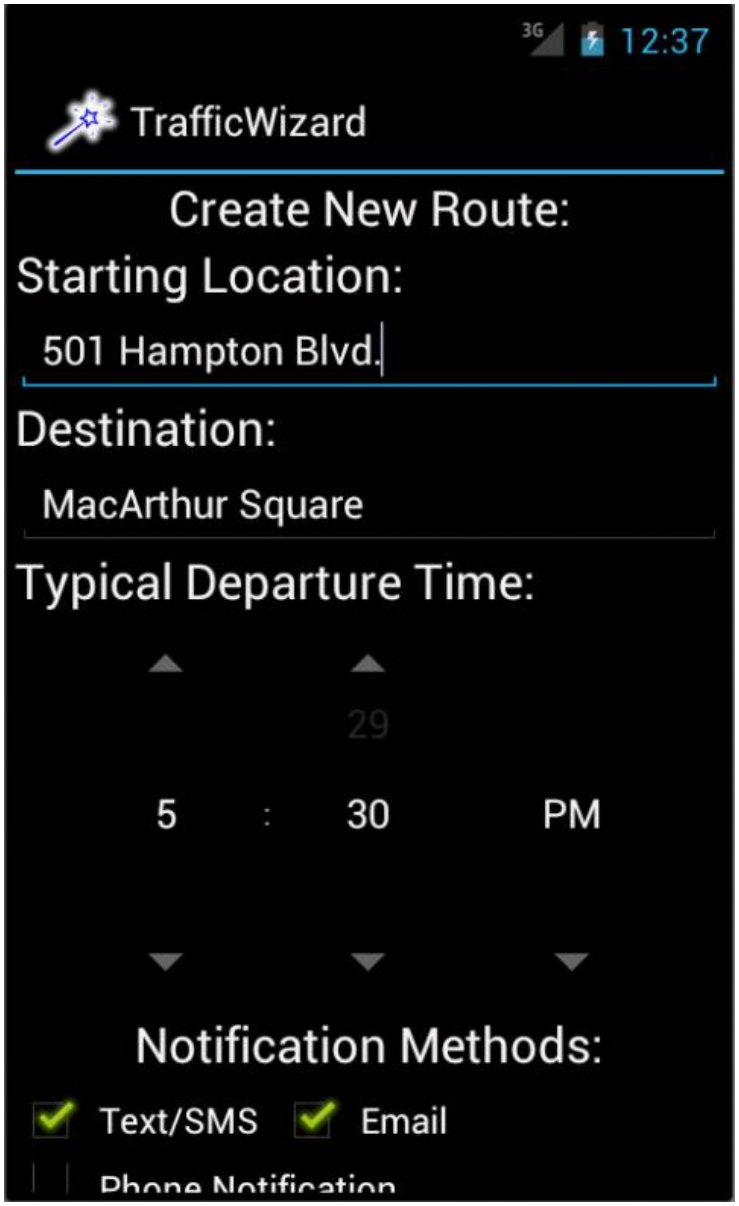
Data Flow


User starts App
Handshake
Processing Server
Traffic Data server
Sent GPS data
Send updates to App'
request for data
sent data
User selects destination
Server finds available routes, including traffic data
App allows user to select route
User drives along selected route
Gps location at virtual checkpoint?
Yes
No
Send velocity data to server
No
Arrived at destination?
Yes
Completed route

GUI Map

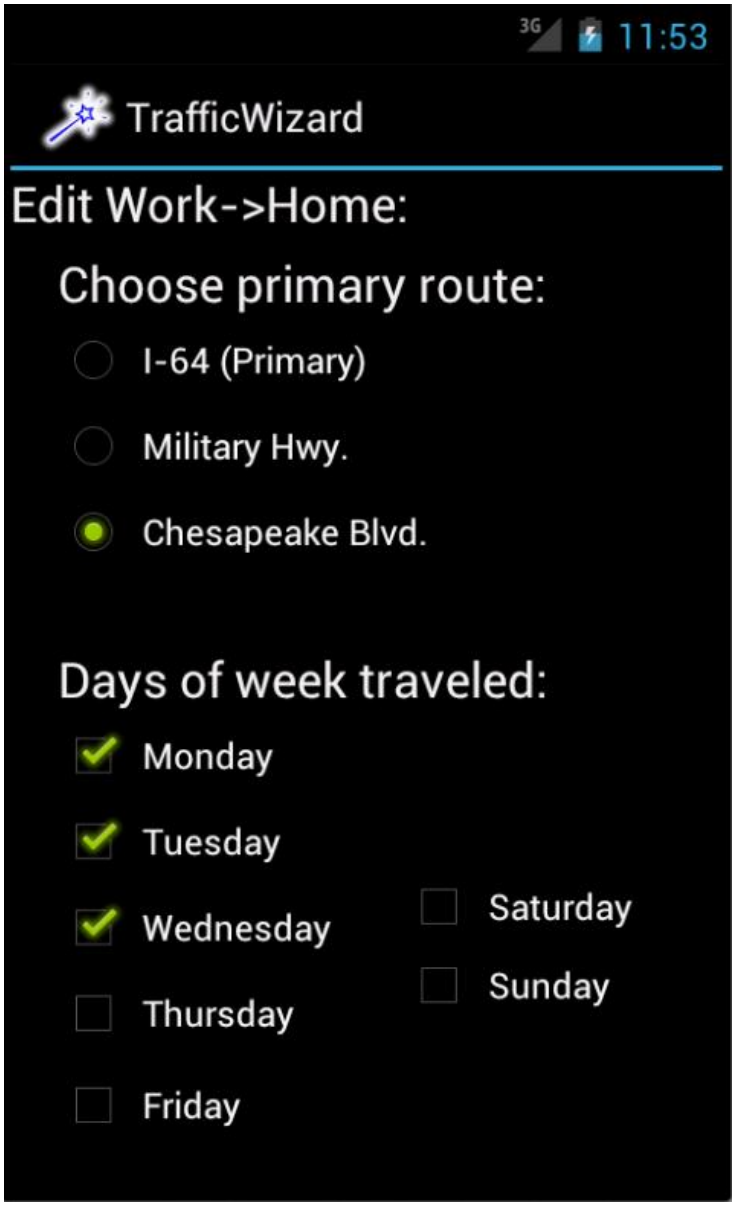

Pretrip Notification
Traffic Wizard
Sends notification to OS
Terminal events
Phone Notification
Login
Register New User
Email
Text Message/SMS
Delay Alert
Home Page
Processing switches to 3rd party GPS app
Navigation
Route Tracer
Trip Programming
Trip Editing
Frequently Traveled
OS notification from app
Notification/Dialog
Change ratings and primary/alt routes
Arrival

New Route Creation



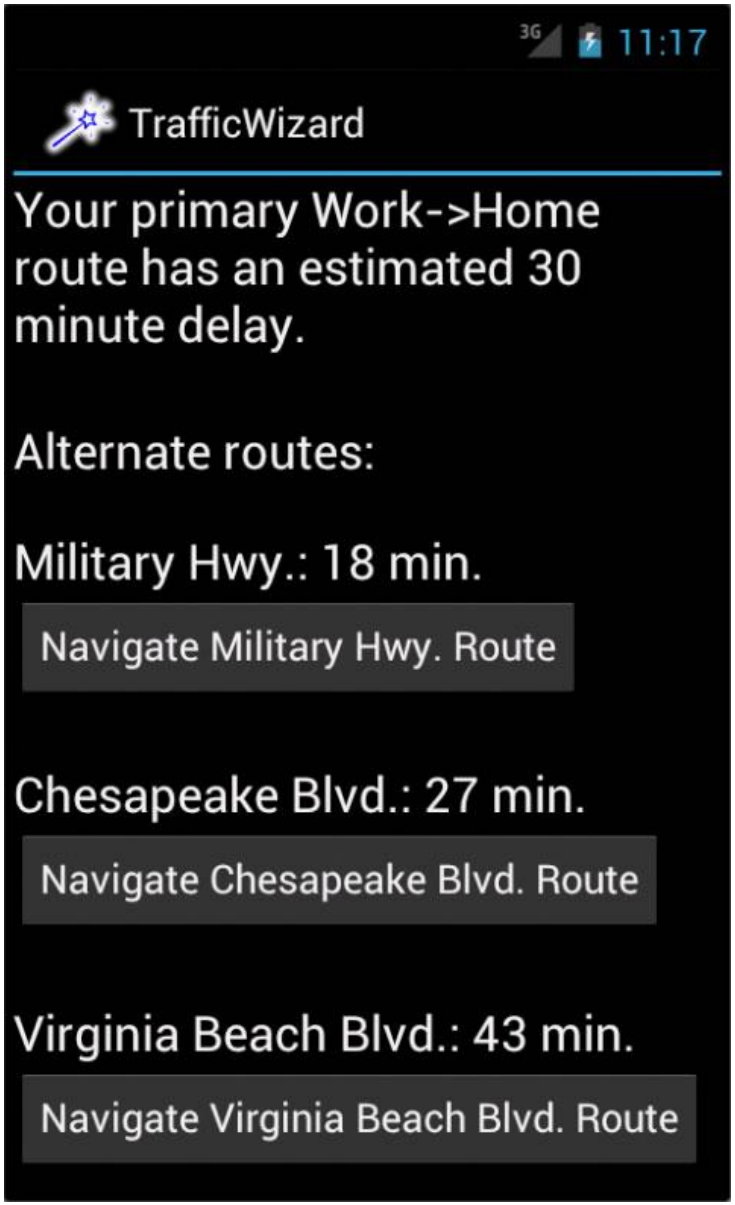
- Location and time specific trips
- Multiple notification methods

Edit Route



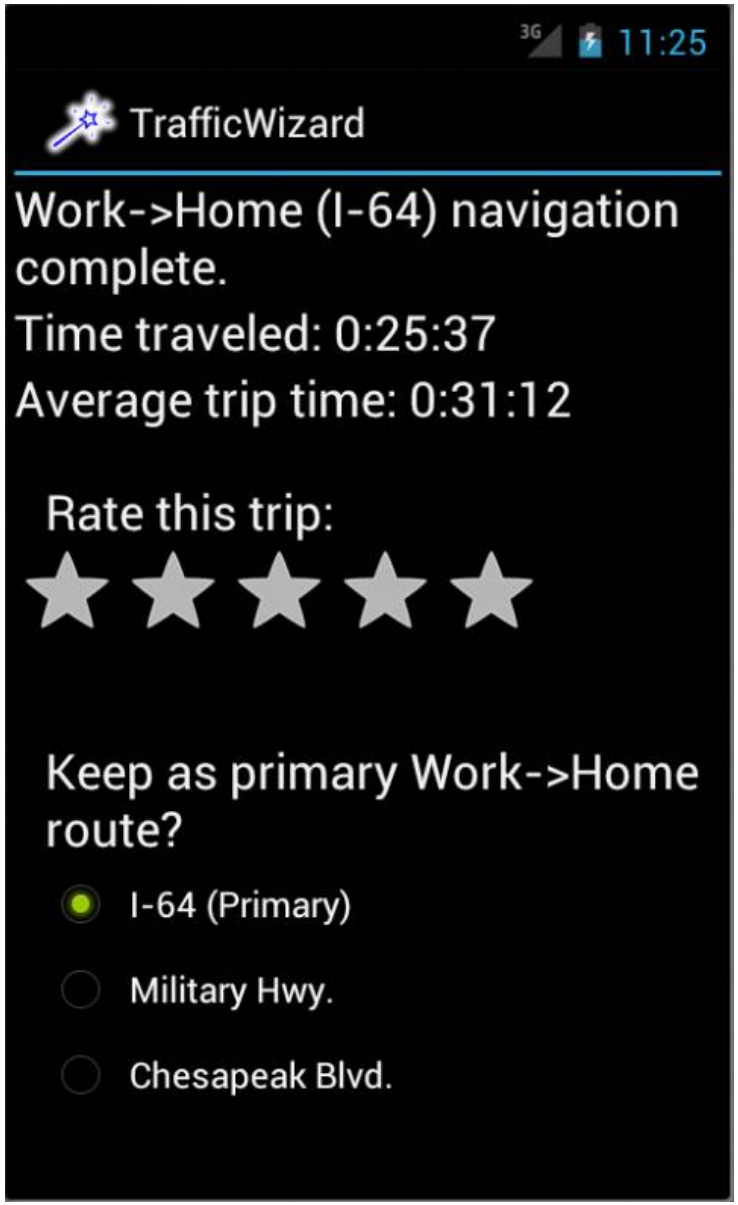
- Change primary route for a trip
- Other trip/route specific settings

Delay Notification



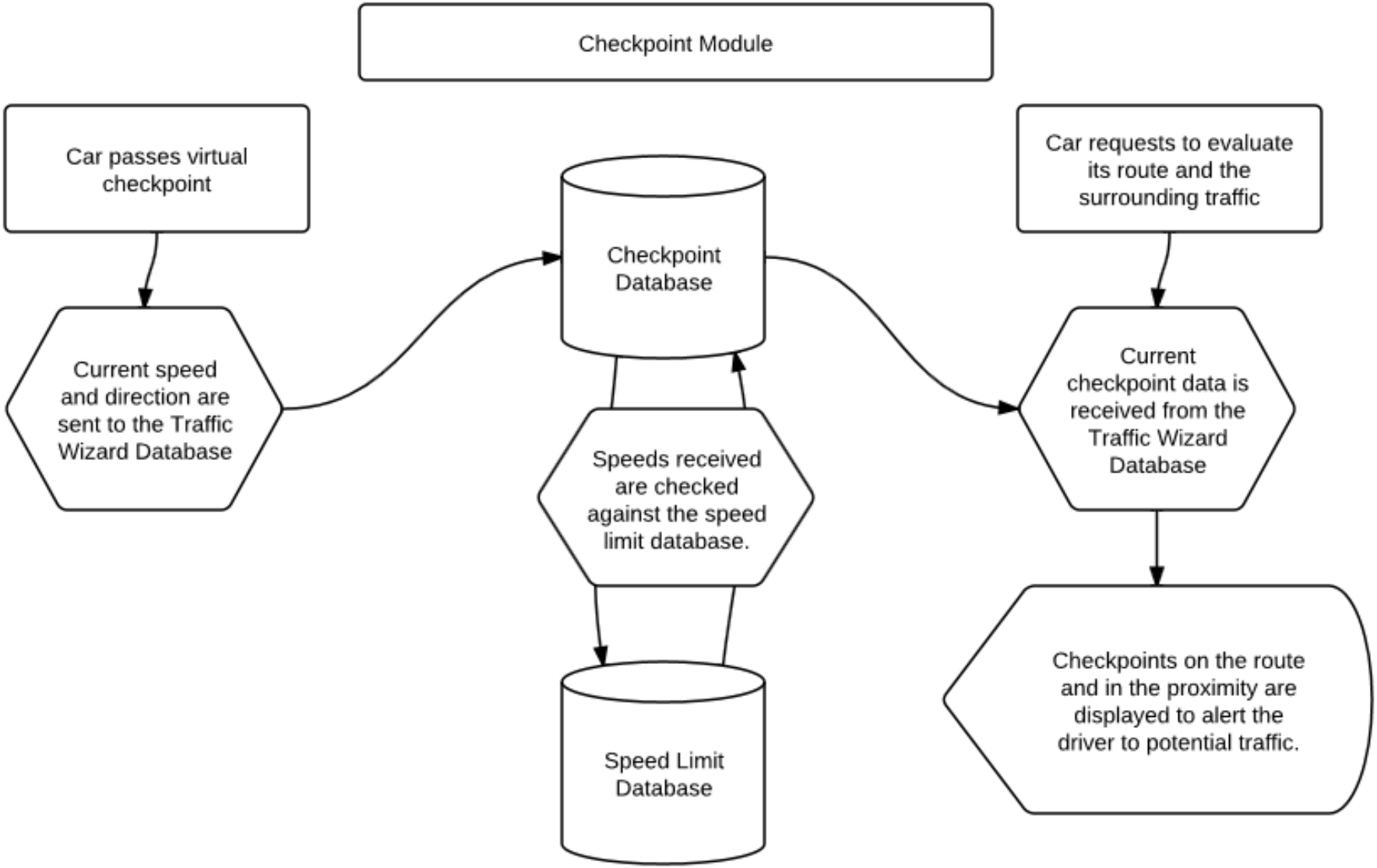
- Shows delay of route to be traveled soon
- Presents data for preprogrammed alternatives
- Leads to 3rd party navigation app

Arrival

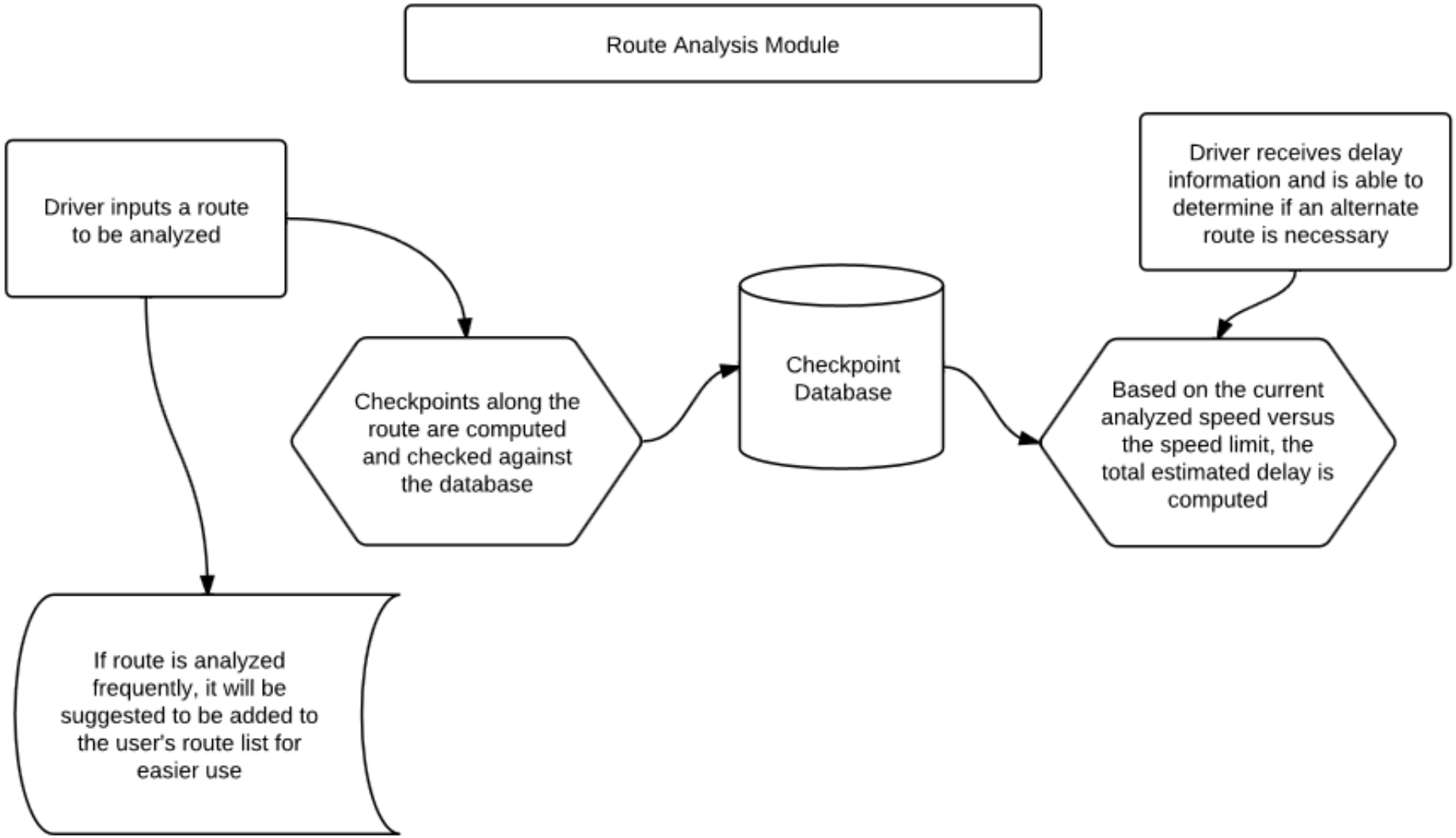


- Ability to adjust options like primary routes and ratings
- Trip summary
- Sends summary data to server

Checkpoint Algorithm



Analysis Algorithm



Testing Phases

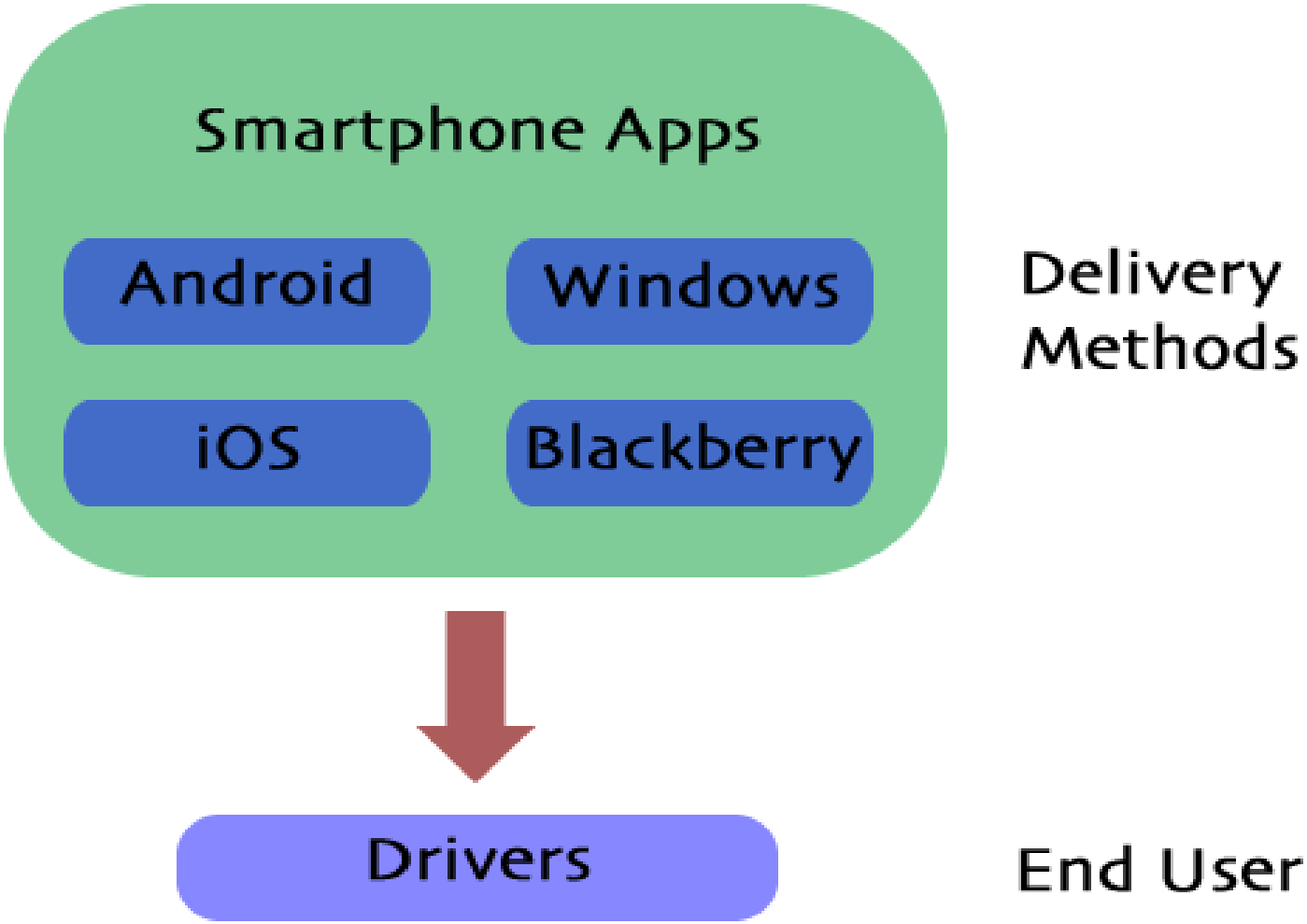
Alpha Testing (Closed)

- Virtual Checkpoint placement verification
- Efficient driver data collection
- Functionality testing (GUI / Analysis)
- Server Load testing

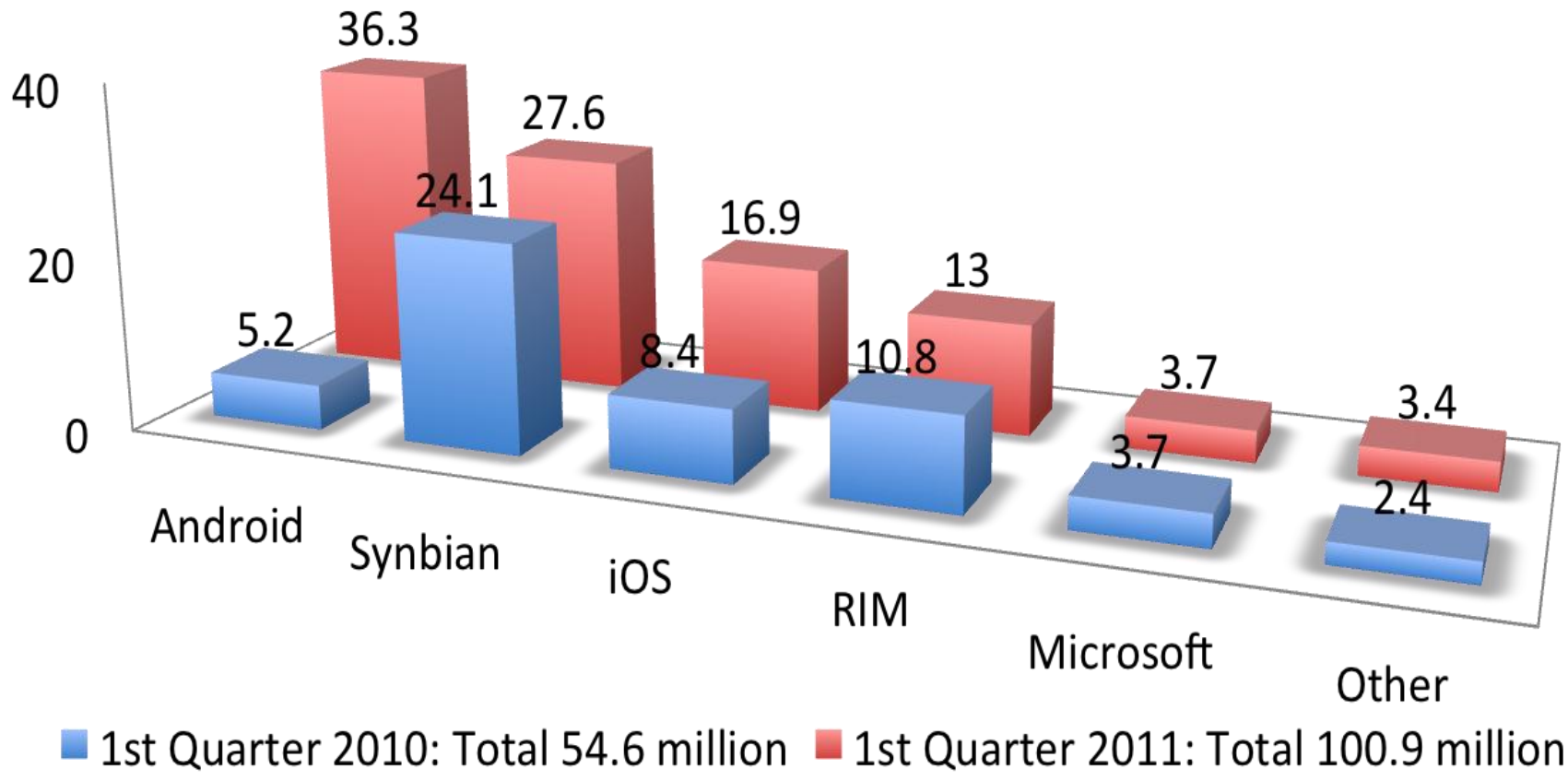
Beta Testing (Public)

- Virtual Checkpoint re-allocation
- Verify driver data transmission throughput
- Trip/Route integration (Profile-based)
- Increased Server Load Testing

Customer Identification



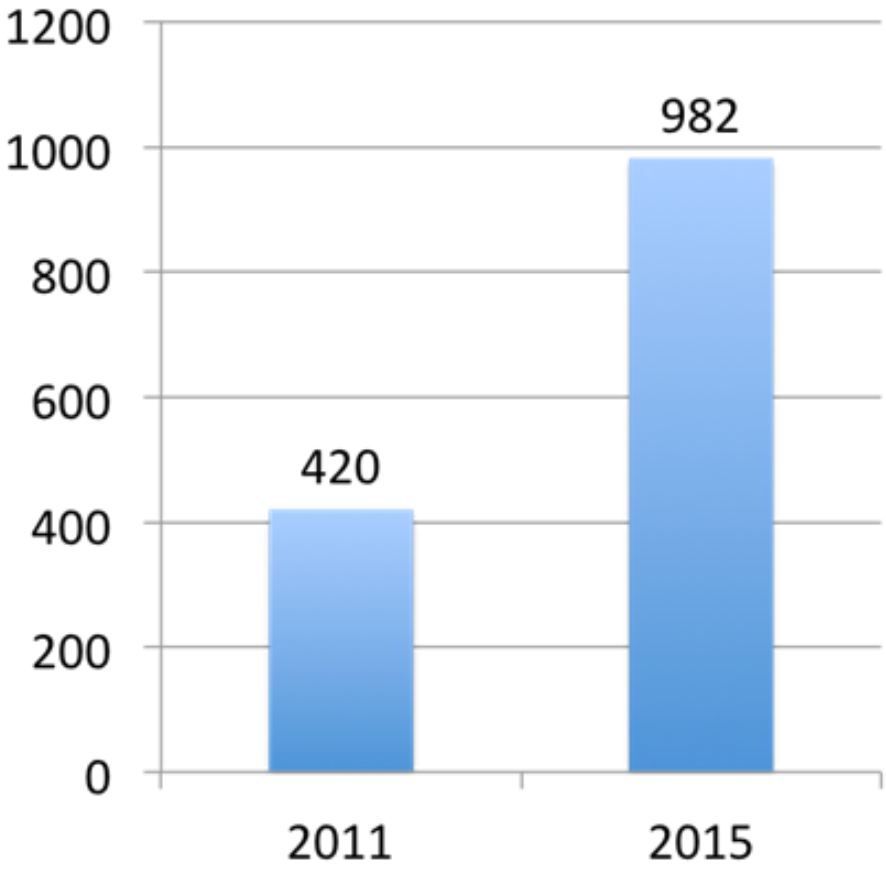
Worldwide Smartphone Sales (millions of units)



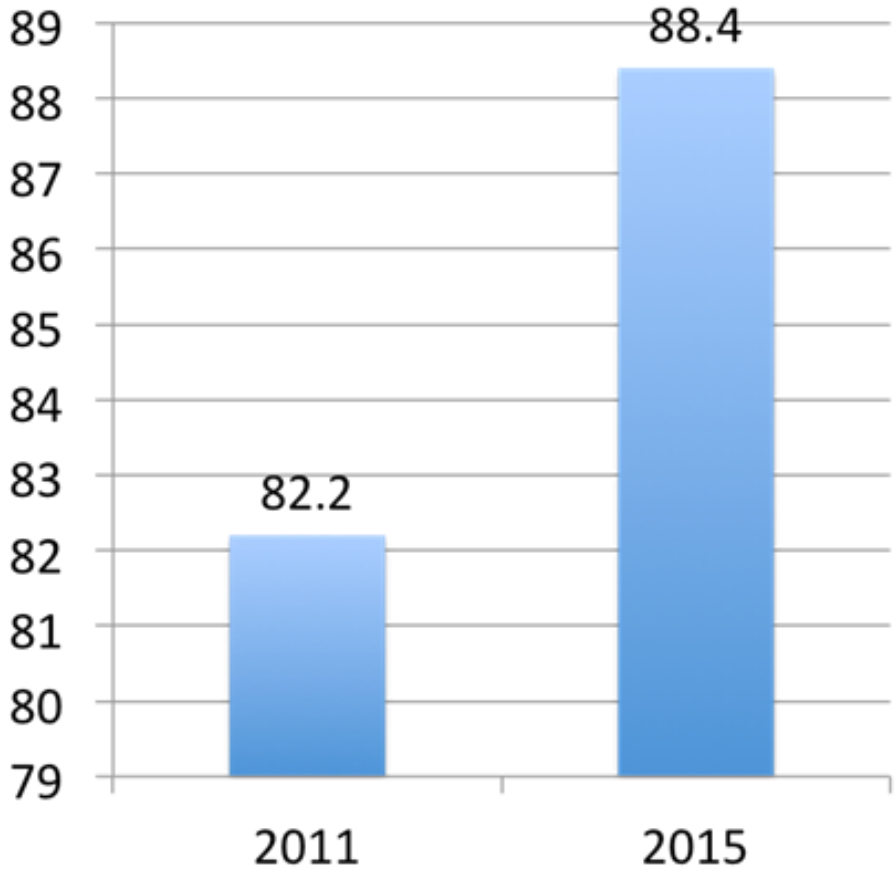
*Source: Mashable Tech

Trends in Handset Sales

Projected Worldwide Smartphone Sales
(Millions of units)



Projected US Smartphone Sales
(Millions of units)

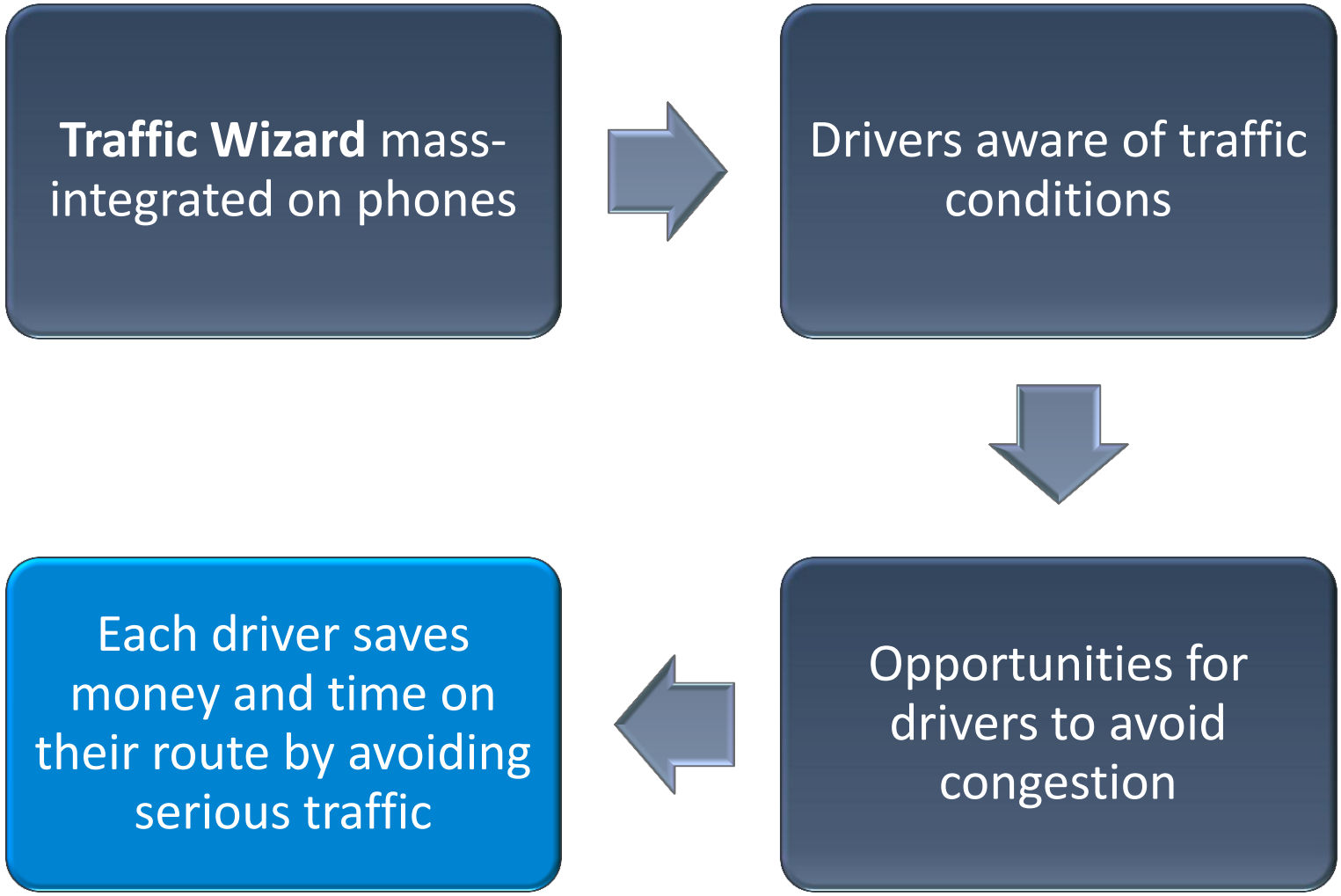


*Source: Email Marketing Reports

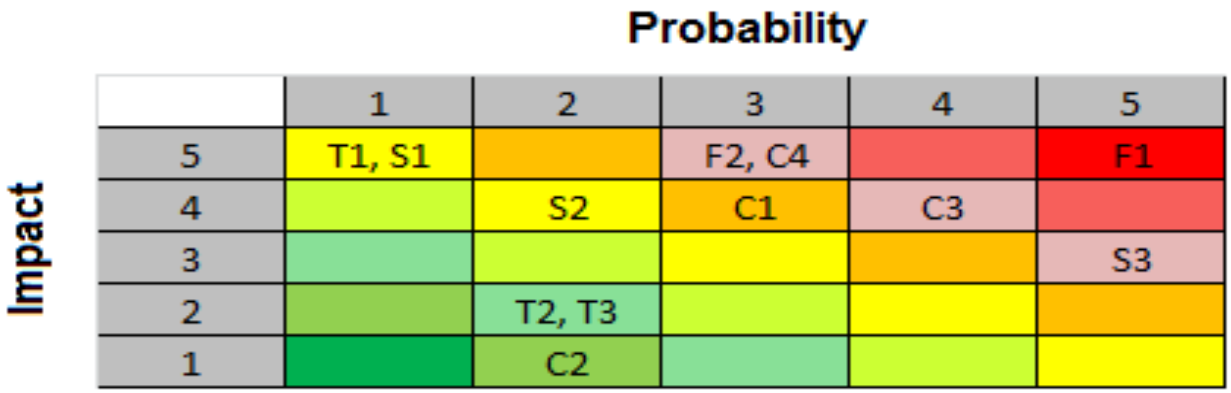
Competition

	Traffic Wizard	INRIX	TomTom	Sygic	RAC Traffic Plus (UK)	Traffic.com	Beat The Traffic
Android Support	X	X		X	X		X
iPhone Support	X	X	X	X	X	X	X
Real-time Traffic Updates	X	X	X	X	X	X	X
Virtual Checkpoint System	X						
Accident Notification	X	X			X	X	X
Time Predictions	X	X	X	X			X
GPS Navigation Routing			X	X			
Traffic Camera Viewer							X
Personalized Travel Patterning	X						

Return on Investment



Risk Assessment



Financial Risks

F1. Customer Investment – Vital to initial growth and sales

F2. Hardware/Software Network Maintenance - Fixing broken equipment, maintaining network

Customer Risks

C1. Product Interest – Market competition

C2. Ease-of-use to Customer – Simple and easy to use interface / installation

C3. Driver Distraction – Interaction becomes a potential distraction

C4. Product Accessibility – Requires smartphone / data plan to provide updates

Technical Risks

T1. Hardware Selection – Feature limitations

T2. Communication Protocols – Usefulness and latency of technology

T3. Server Infrastructure – Configuration for distribution (scalability)

Schedule Risks

S1. Hardware Selection – Platform switching

S2. Product Design – Oversights in implementation, setting up virtual checkpoints

S3. Prototype / Test Phase – Dependent on quality, resolving issues

Financial Risks

F1. Customer Investment

Probability 5 *Impact 5*

The Traffic Wizard app cannot succeed if customers do not buy into it. This is highly dependent on marketing and can be counter-acted with effective advertising and marketing.

F2. Hardware/Software Network Maintenance

Probability 3 *Impact 5*

Server infrastructure is subject to needing repairs and the network connecting drivers must be maintained. Since the foundation of the app lies in drivers' smartphones (as opposed to additional hardware), the probability of this decreases.

Customer Risks

C1. Product Interest
Probability 3 Impact 4
With so many products and competition in the market, customers will need to prefer this solution over others. This can be mitigated with effective marketing.

C2. Ease-of-use to Customer
Probability 2 Impact 1
Low cost, efficient, and easy installation of the product onto drivers' smartphones.

C3. Driver Distraction
Probability 4 Impact 4
Interaction with an app while driving is a high distraction risk. This will be counteracted with a minimalistic interface that assists the driver with little to no physical interaction with the device.

C4. Product Accessibility
Probability 3 Impact 5
Not every driver has a smartphone to access and download the app. The smartphone market has been well analyzed and is expected to grow immensely.

Technical Risks

T1. Hardware Selection
Probability 1 Impact 5
The selected hardware will heavily influence the product's features – limiting the uses of Traffic Wizard. Smartphones apps are an effective platform to be accessible to drivers and provide lots of functionality.

T2. Communication Protocols
Probability 2 Impact 2
Communication between a device and the cloud must occur within small time frames. Latency will negate the usefulness of traffic data. Traffic Wizard's virtual checkpoint system will assist with efficient information exchange.

T3. Server Infrastructure
Probability 2 Impact 2
The configuration and design of the server infrastructure must be able to compile and distribute data to connected drivers. The server will have to be designed to be efficiently scalable. Traffic Wizard will hold the potential to connect with manufacturer telematics to assist with scalability in the future.

Schedule Risks

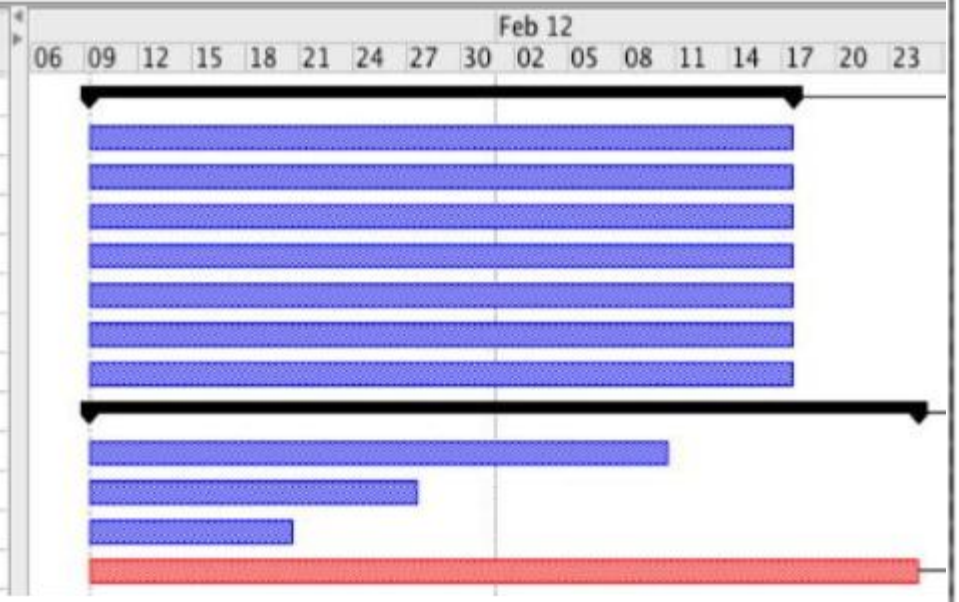
S1. Hardware Selection
Probability 1 Impact 5
The initial platform selection influences later decisions for product features. Traffic Wizard, as a smartphone app, has access to many features that assist in the functionality of this program.

S2. Product Design
Probability 2 Impact 4
Oversights in implementation and development can significantly delay progress of the app. The virtual checkpoint system will have to be practiced and polished before being considered useable.

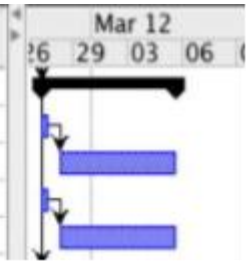
S3. Prototype/Testing Phase
Probability 5 Impact 3
This phase is directly dependent on the quality of execution of the product. Design issues must be resolved in this stage and the program must be proven to work.

Work Breakdown: Planning/Purchasing

Name	Duration	Start	Finish
Develop Project Team	30 days	**1/9/12 8:00 AM**	**2/17/12 5:00 PM**
Interview/Hire Webmaster	30 days	1/9/12 8:00 AM	2/17/12 5:00 PM
Interview/Hire Database Developer	30 days	1/9/12 8:00 AM	2/17/12 5:00 PM
Interview/Hire Software Developer	30 days	1/9/12 8:00 AM	2/17/12 5:00 PM
Interview/Hire GUI Developer	30 days	1/9/12 8:00 AM	2/17/12 5:00 PM
Interview/Hire Reports Expert	30 days	1/9/12 8:00 AM	2/17/12 5:00 PM
Interview/Hire Marketing Specialist	30 days	1/9/12 8:00 AM	2/17/12 5:00 PM
Interview/Hire Documentation Specialist	30 days	1/9/12 8:00 AM	2/17/12 5:00 PM
Planning	35 days	**1/9/12 8:00 AM**	**2/24/12 5:00 PM**
Risk Management	25 days	1/9/12 8:00 AM	2/10/12 5:00 PM
Support Plan	15 days	1/9/12 8:00 AM	1/27/12 5:00 PM
Hardware Plan	10 days	1/9/12 8:00 AM	1/20/12 5:00 PM
Software Plan	35 days	1/9/12 8:00 AM	2/24/12 5:00 PM

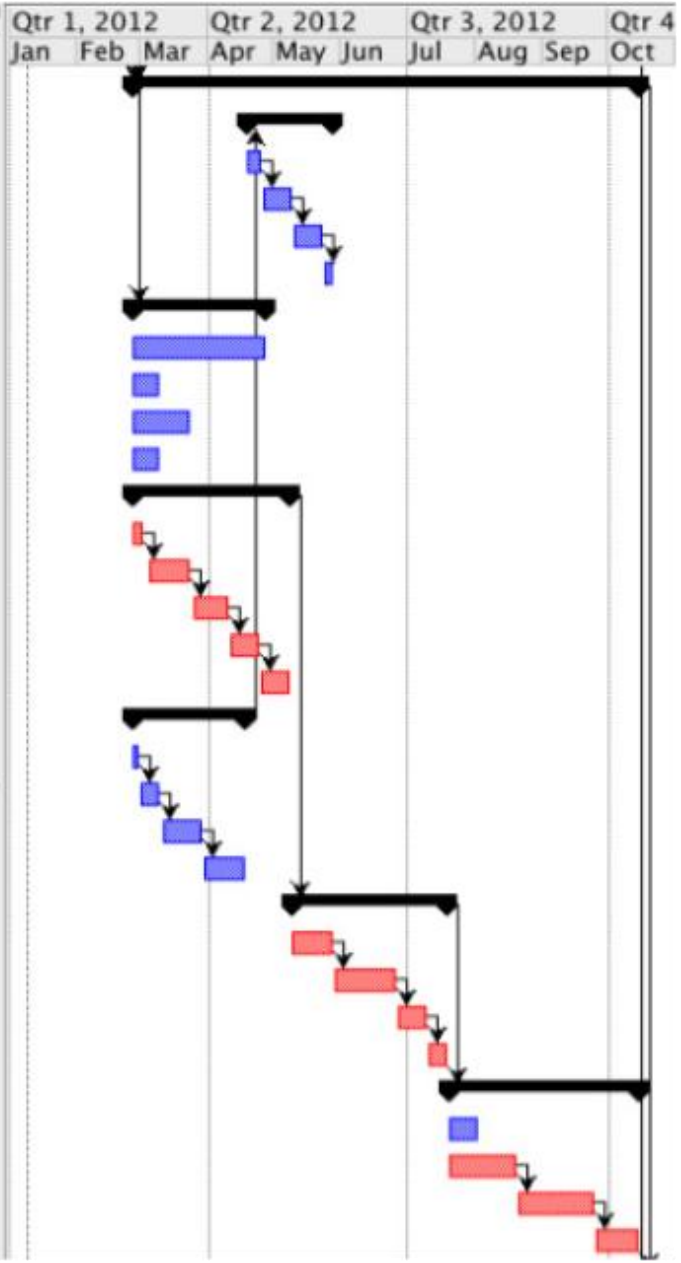


Name	Duration	Start	Finish
Hardware	6 days	**2/27/12 8:00 AM**	**3/5/12 5:00 PM**
Research workstation brand/model	1 day	2/27/12 8:00 AM	2/27/12 5:00 PM
Purchase workstations	5 days	2/28/12 8:00 AM	3/5/12 5:00 PM
Research server brand/model	1 day	2/27/12 8:00 AM	2/27/12 5:00 PM
Purchase server	5 days	2/28/12 8:00 AM	3/5/12 5:00 PM



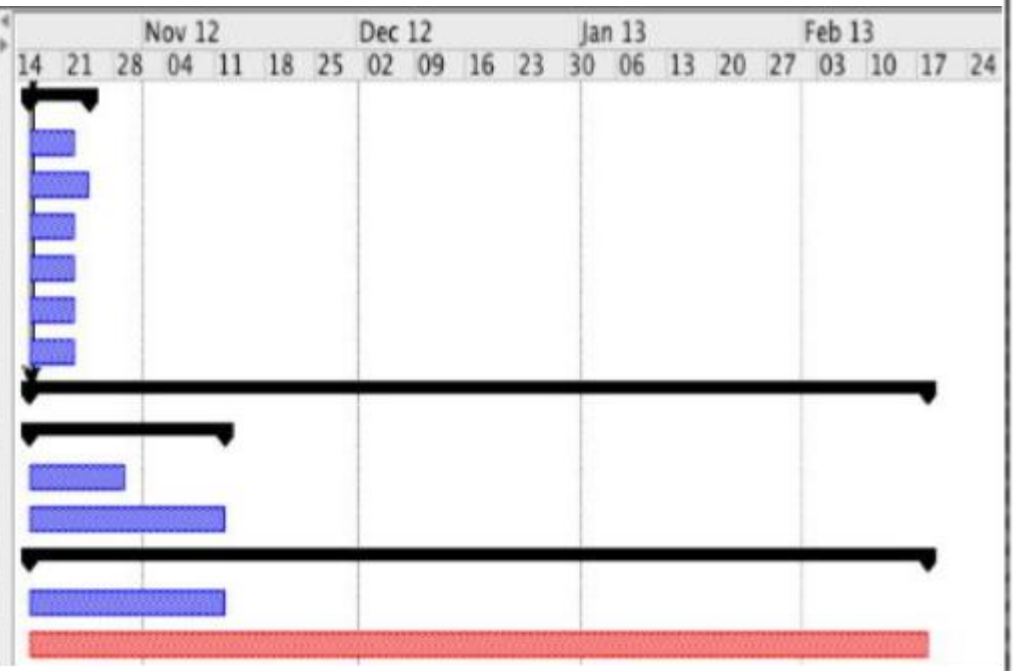
Work Breakdown: Software

Name	Duration	Start	Finish
Software Development	166 days	**2/27/12 8:00 AM**	**10/15/12 5:00 PM**
GUI Development	28 days	**4/19/12 8:00 AM**	**5/28/12 5:00 PM**
Analysis	5 days	4/19/12 8:00 AM	4/25/12 5:00 PM
Design	10 days	4/26/12 8:00 AM	5/9/12 5:00 PM
Implementation	10 days	5/10/12 8:00 AM	5/23/12 5:00 PM
Testing	3 days	5/24/12 8:00 AM	5/28/12 5:00 PM
Algorithm Development	45 days	**2/27/12 8:00 AM**	**4/27/12 5:00 PM**
Virtual Checkpoint Allocation Algorithm	45 days	2/27/12 8:00 AM	4/27/12 5:00 PM
GPS Data Collection Algorithm	10 days	2/27/12 8:00 AM	3/9/12 5:00 PM
Route Analysis Algorithm	20 days	2/27/12 8:00 AM	3/23/12 5:00 PM
Congestion Notification Algorithm	10 days	2/27/12 8:00 AM	3/9/12 5:00 PM
Database Development	52 days	**2/27/12 8:00 AM**	**5/8/12 5:00 PM**
Analysis	5 days	2/27/12 8:00 AM	3/2/12 5:00 PM
Design	15 days	3/5/12 8:00 AM	3/23/12 5:00 PM
Implementation	12 days	3/26/12 8:00 AM	4/10/12 5:00 PM
Integration	10 days	4/11/12 8:00 AM	4/24/12 5:00 PM
Testing	10 days	4/25/12 8:00 AM	5/8/12 5:00 PM
Hardware Interface Development	38 days	**2/27/12 8:00 AM**	**4/18/12 5:00 PM**
Analysis	3 days	2/27/12 8:00 AM	2/29/12 5:00 PM
Design	7 days	3/1/12 8:00 AM	3/9/12 5:00 PM
Implementation	14 days	3/12/12 8:00 AM	3/29/12 5:00 PM
Testing	14 days	3/30/12 8:00 AM	4/18/12 5:00 PM
Data Mining	52 days	**5/9/12 8:00 AM**	**7/19/12 5:00 PM**
Analysis	14 days	5/9/12 8:00 AM	5/28/12 5:00 PM
Design	21 days	5/29/12 8:00 AM	6/26/12 5:00 PM
Implementation	10 days	6/27/12 8:00 AM	7/10/12 5:00 PM
Testing	7 days	7/11/12 8:00 AM	7/19/12 5:00 PM
Traffic Analysis Engine	62 days	**7/20/12 8:00 AM**	**10/15/12 5:00 PM**
Analysis	10 days	7/20/12 8:00 AM	8/2/12 5:00 PM
Design	22 days	7/20/12 8:00 AM	8/20/12 5:00 PM
Implementation	25 days	8/21/12 8:00 AM	9/24/12 5:00 PM
Testing	15 days	9/25/12 8:00 AM	10/15/12 5:00 PM



Work Breakdown: Testing

Name	Duration	Start	Finish
⊟Documentation	7 days	**10/16/12 8:00 AM**	**10/24/12 5:00 PM**
Database Documents	5 days	10/16/12 8:00 AM	10/22/12 5:00 PM
Algorithm Documents	7 days	10/16/12 8:00 AM	10/24/12 5:00 PM
Hardware Interface Documents	5 days	10/16/12 8:00 AM	10/22/12 5:00 PM
Data Mining Documents	5 days	10/16/12 8:00 AM	10/22/12 5:00 PM
Traffic Analysis Engine Documents	5 days	10/16/12 8:00 AM	10/22/12 5:00 PM
GUI Documents	5 days	10/16/12 8:00 AM	10/22/12 5:00 PM
⊟Testing	90 days	**10/16/12 8:00 AM**	**2/18/13 5:00 PM**
⊟Alpha	20 days	**10/16/12 8:00 AM**	**11/12/12 5:00 PM**
Server Load Testing	10 days	10/16/12 8:00 AM	10/29/12 5:00 PM
System Functionality Testing	20 days	10/16/12 8:00 AM	11/12/12 5:00 PM
⊟Beta	90 days	**10/16/12 8:00 AM**	**2/18/13 5:00 PM**
Server Load Testing	20 days	10/16/12 8:00 AM	11/12/12 5:00 PM
System Functionality Testing	90 days	10/16/12 8:00 AM	2/18/13 5:00 PM



Phase 2 Staffing

Position	Number of Employees	Salary	Hourly Rate*	Cost
Project Manager	1	$84,000	$42.00	$74,760.0
Software Engineer	2	$68,000	$34.00	$121,040.0
Financial Director	1	$60,000	$30.00	$53,400.0
Marketing Director	1	$65,000	$32.50	$57,850.0
Documentation Specialist	1	$38,000	$19.00	$33,820.00
HR Manager	1	$58,000	$29.00	$52,200.0
Database Administrator	1	$80,000	$40.00	$72,000.0
Software/Hardware Tester	1	$62,000	$31.00	$55,800.0
Salary Cost				$520,870.00
40% Overhead				$208,348.00
Total Cost (Phase 2 Staffing)				**$729,218.00**

Hardware Requirements

Description	Quantity	Cost Per Unit	Total Cost
Workstations	12	$1,000.00	$12,000.00
Servers	6	$5,000.00	$30,000.00
Android Phones	12	$600.00	$7,200.00
Google Maps API	1	$10,000.00	$10,000.00
SQL			
XML			
PHP			
Apache			
	Total:		$59,200.00

Conclusion

Traffic Wizard will assist drivers by providing effective real-time updates on upcoming traffic conditions beforehand and helping them avoid unfavorable traffic congestion.
With Traffic Wizard's virtual checkpoint system, custom route profile utility, and pre-travel route analysis engine, this will be accomplished in a new way that makes these benefits accessible and more effective than ever.

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