

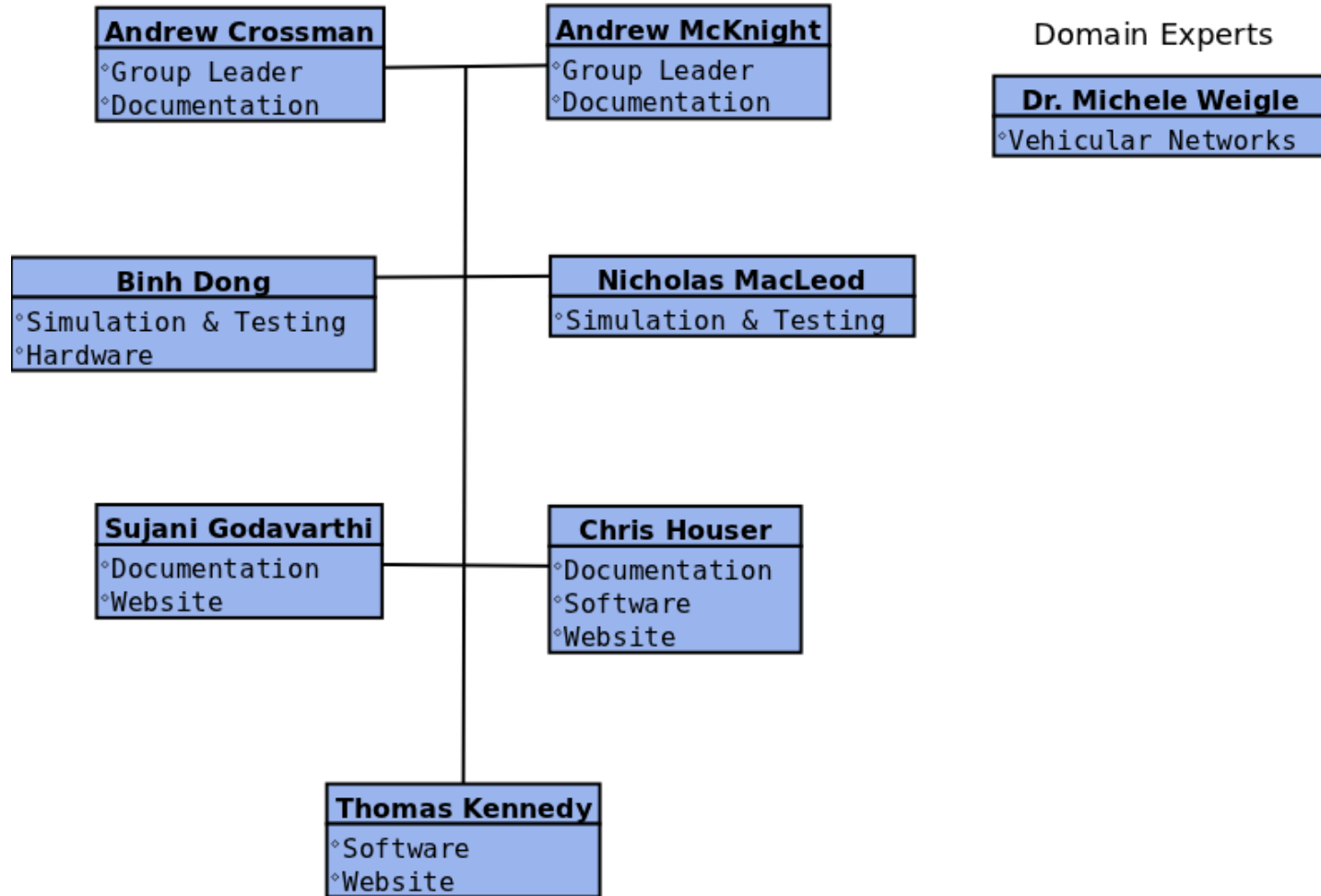
CS 410 – Blue Team

RoadNet

Outline

- Team Blue Staff Chart
- Societal Problem
- Problem Details
- Traffic Data
- Customer Identification
- Market Analysis
- Competition
- RoadNet Solution
- Without RoadNet
- With RoadNet
- Major Functional Components
- Risk Assessment
- Conclusion

Team Blue Staff Chart



Societal Problem

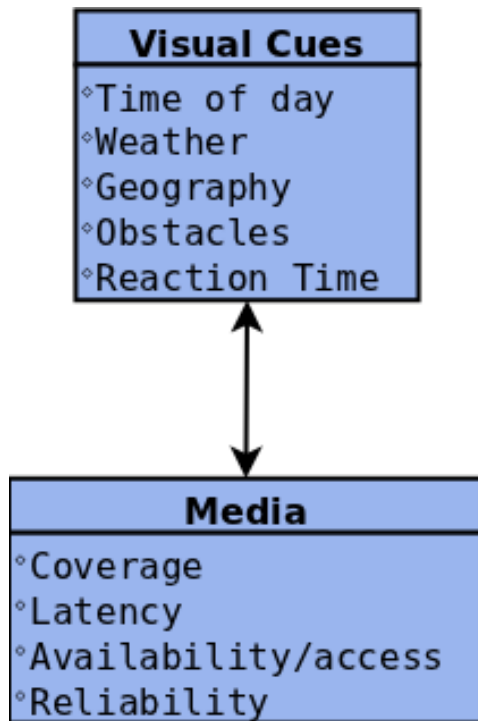
Drivers' limited awareness of adverse road conditions increases the potential for traffic congestion and collisions.

Heavy Traffic & Collision Avoidance

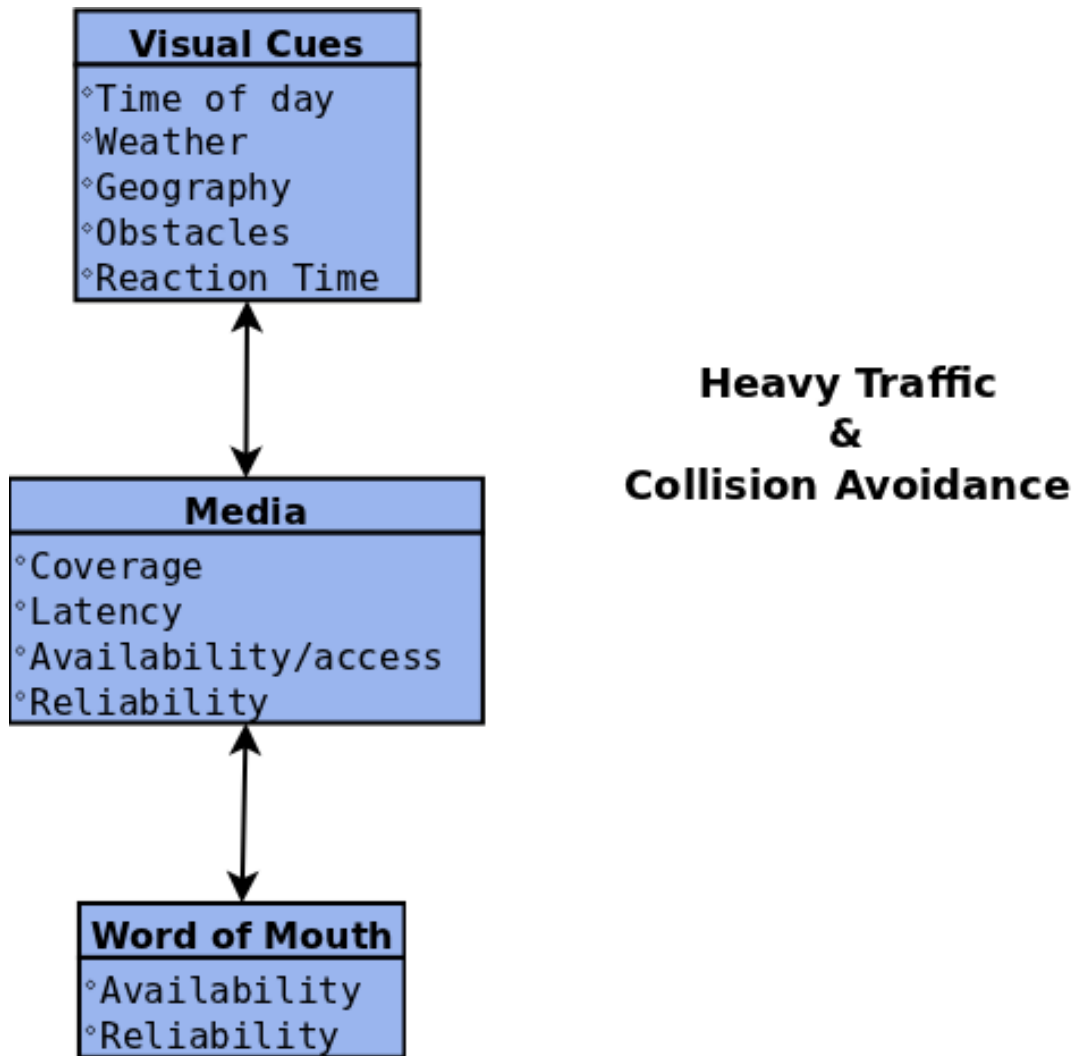
Visual Cues

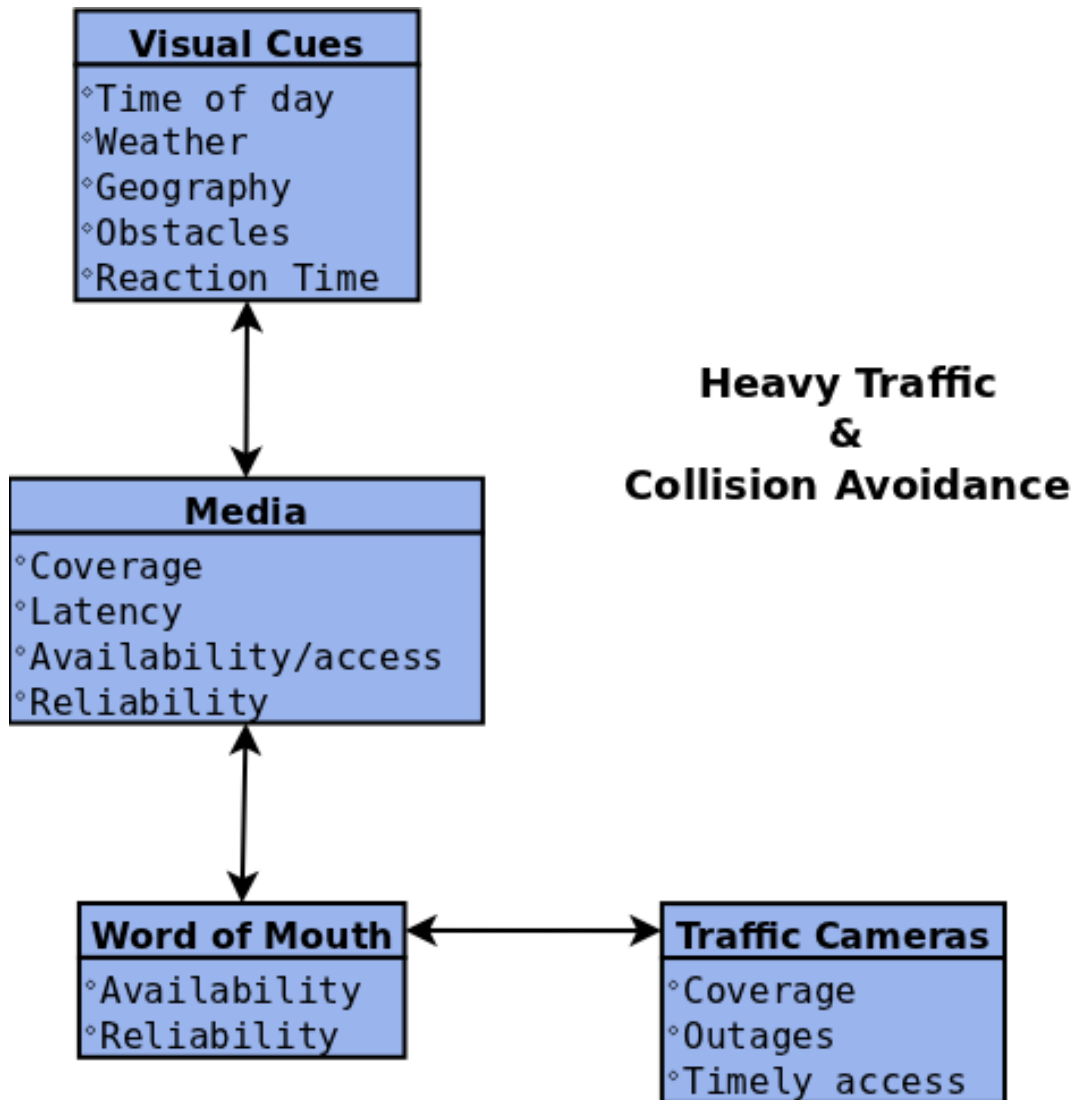
- ◊Time of day
- ◊Weather
- ◊Geography
- ◊Obstacles
- ◊Reaction Time

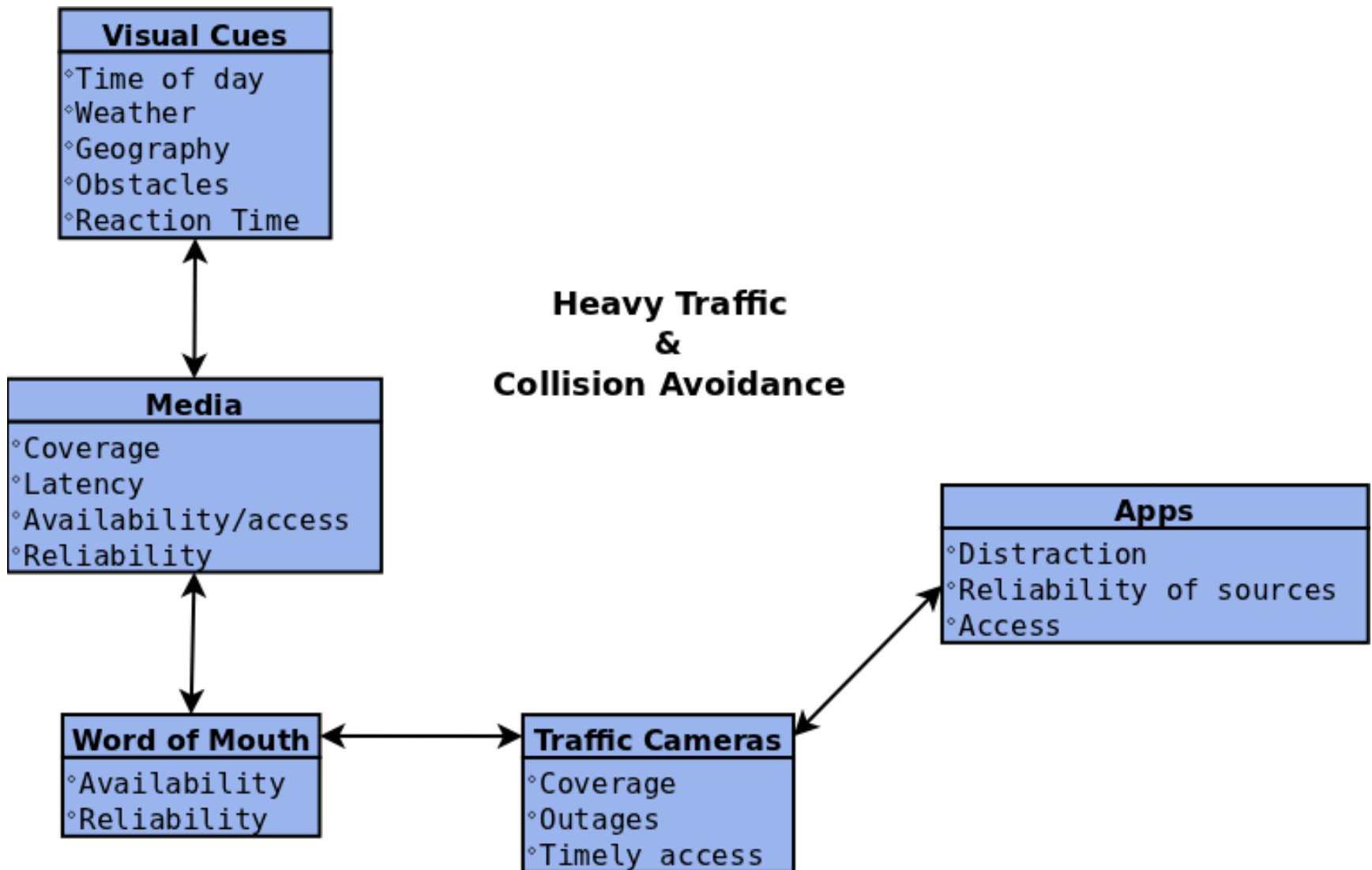
Heavy Traffic & Collision Avoidance

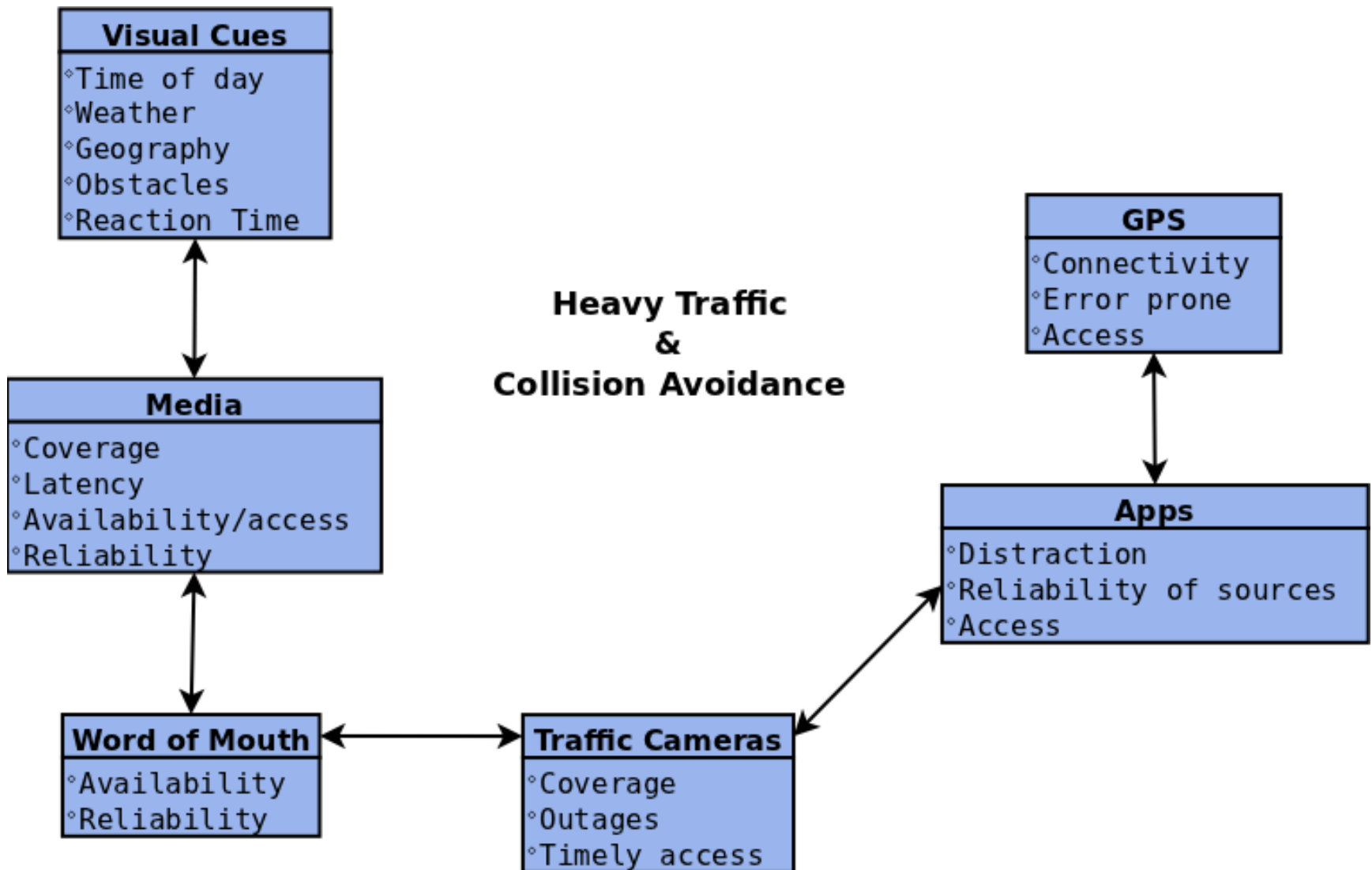


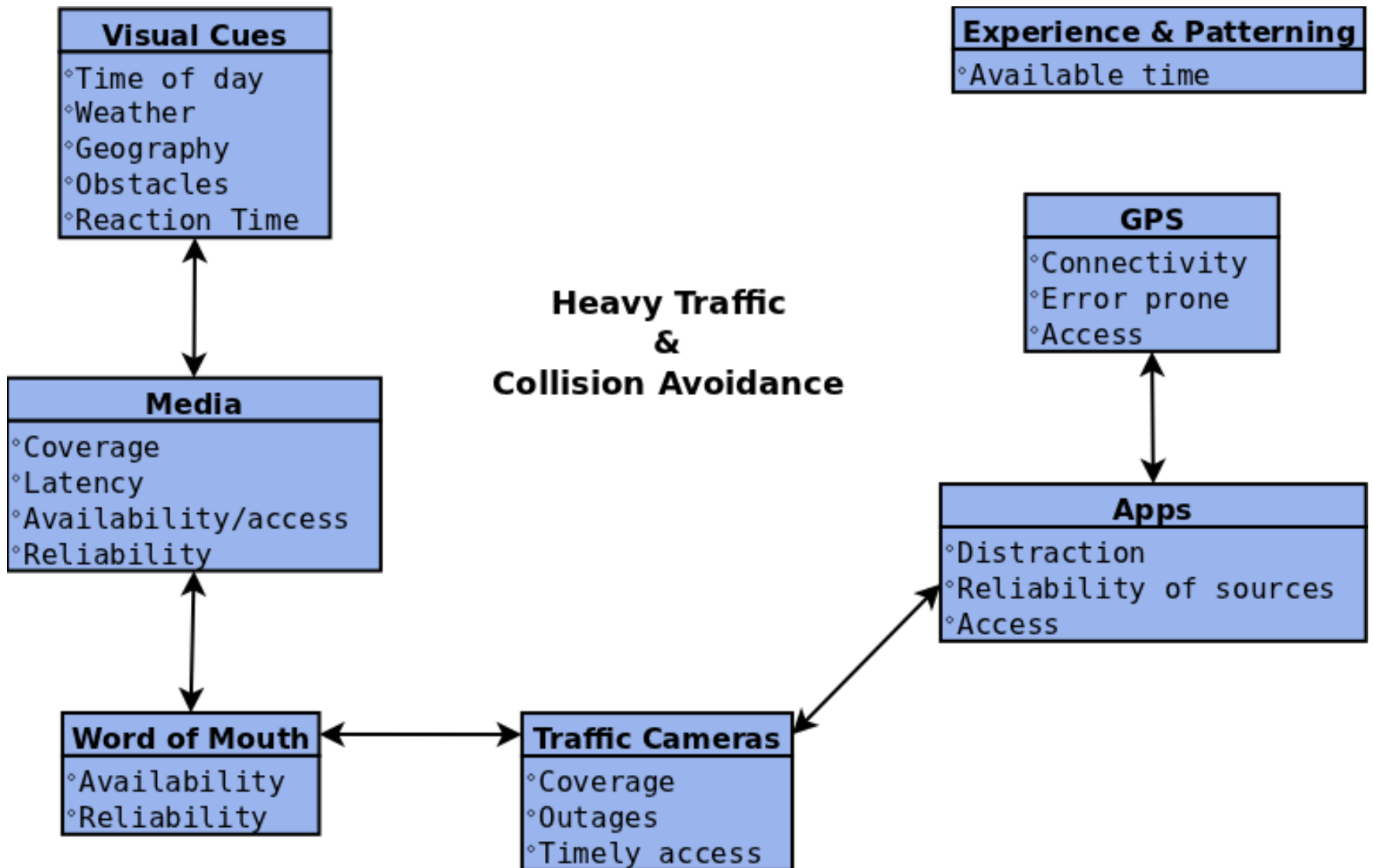
**Heavy Traffic
&
Collision Avoidance**











Problem Details

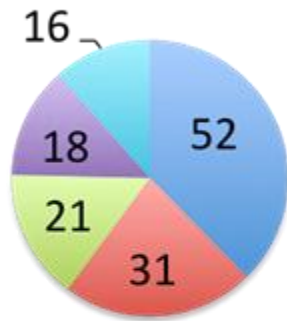
- Drivers unaware of traffic congestion on their intended route are likely to get stuck in that traffic.
- “Surprise” road conditions (construction, accidents) can sometimes lead to an accident if a driver does not know of it soon enough.
- In 2009, 33,808 people were killed in traffic crashes and over 2.2 million were injured.⁶
- Drivers need to be informed of dangerous conditions before it is too late.
- “Security is a hard issue ... and nobody has really solved it yet.” – Dr. Weigle on existing vehicle-to-vehicle communication.²

²Source: Interview with Dr. Weigle

⁶Source: U.S. Census Bureau

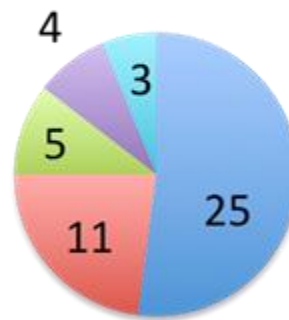
Traffic Data

Hours Delayed
(per commuter)

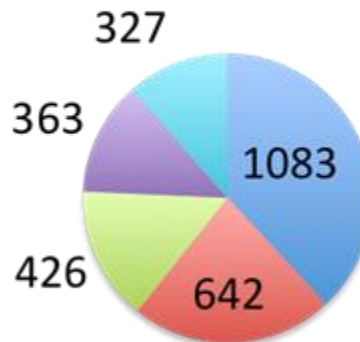


- Very Large Areas
- Large Areas
- Medium Areas
- Small Areas
- Other Urban Areas

Gallons of Fuel
(per commuter)



Aggregate Cost
(Dollars per commuter)



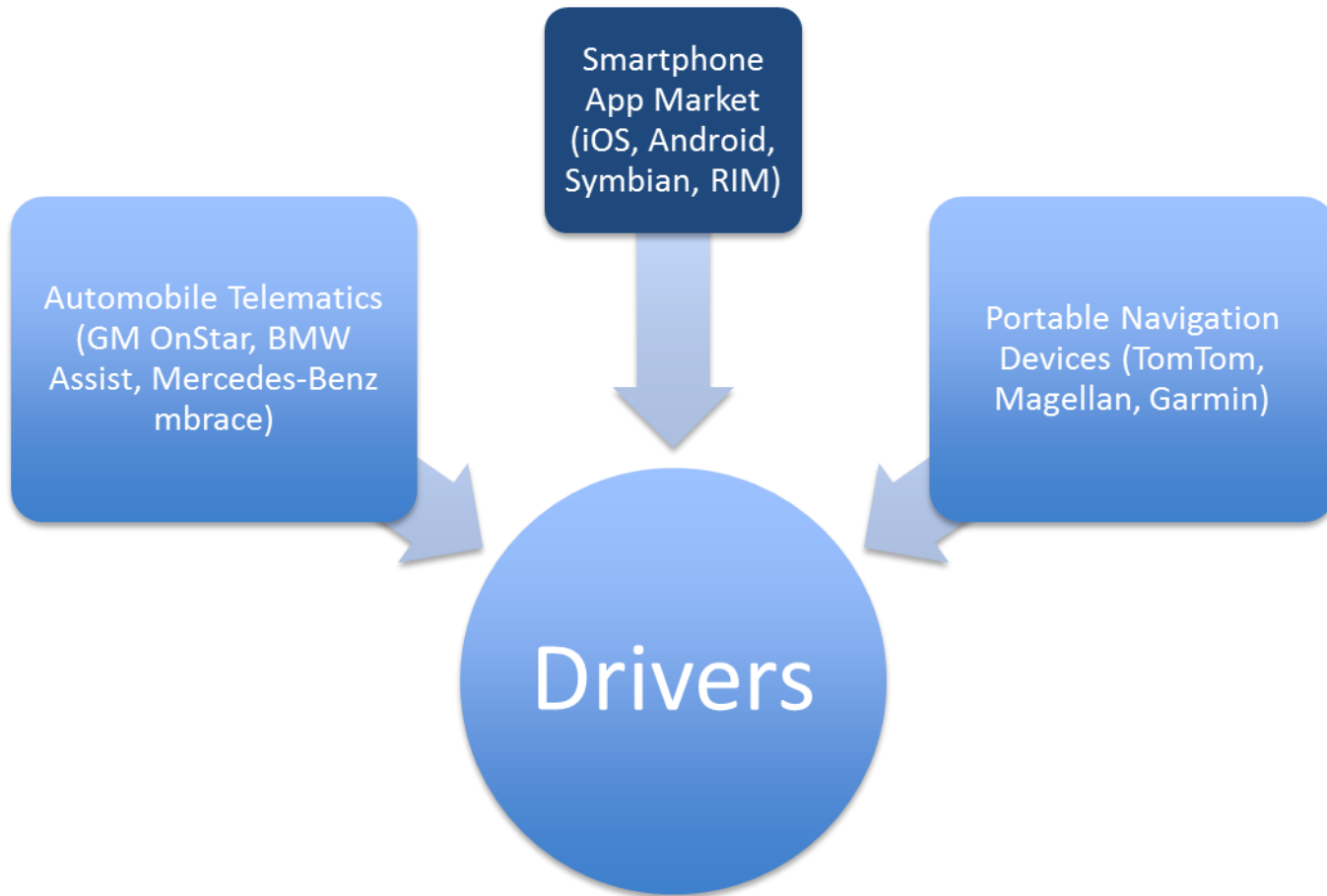
Total Cost:
\$100.9 billion

Total Delay:
4.8 billion hours

Total Fuel Consumption:
1.9 billion gallons

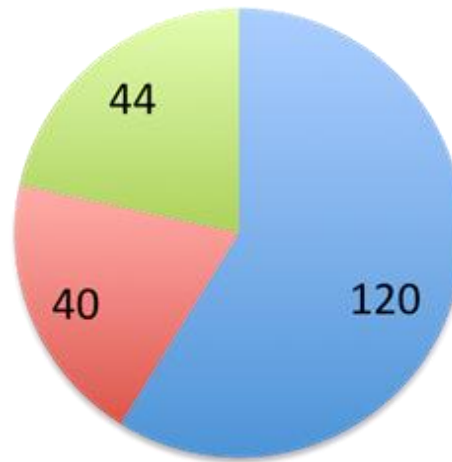
⁴Source: Texas Transportation Institute

Customer Identification



Market Analysis

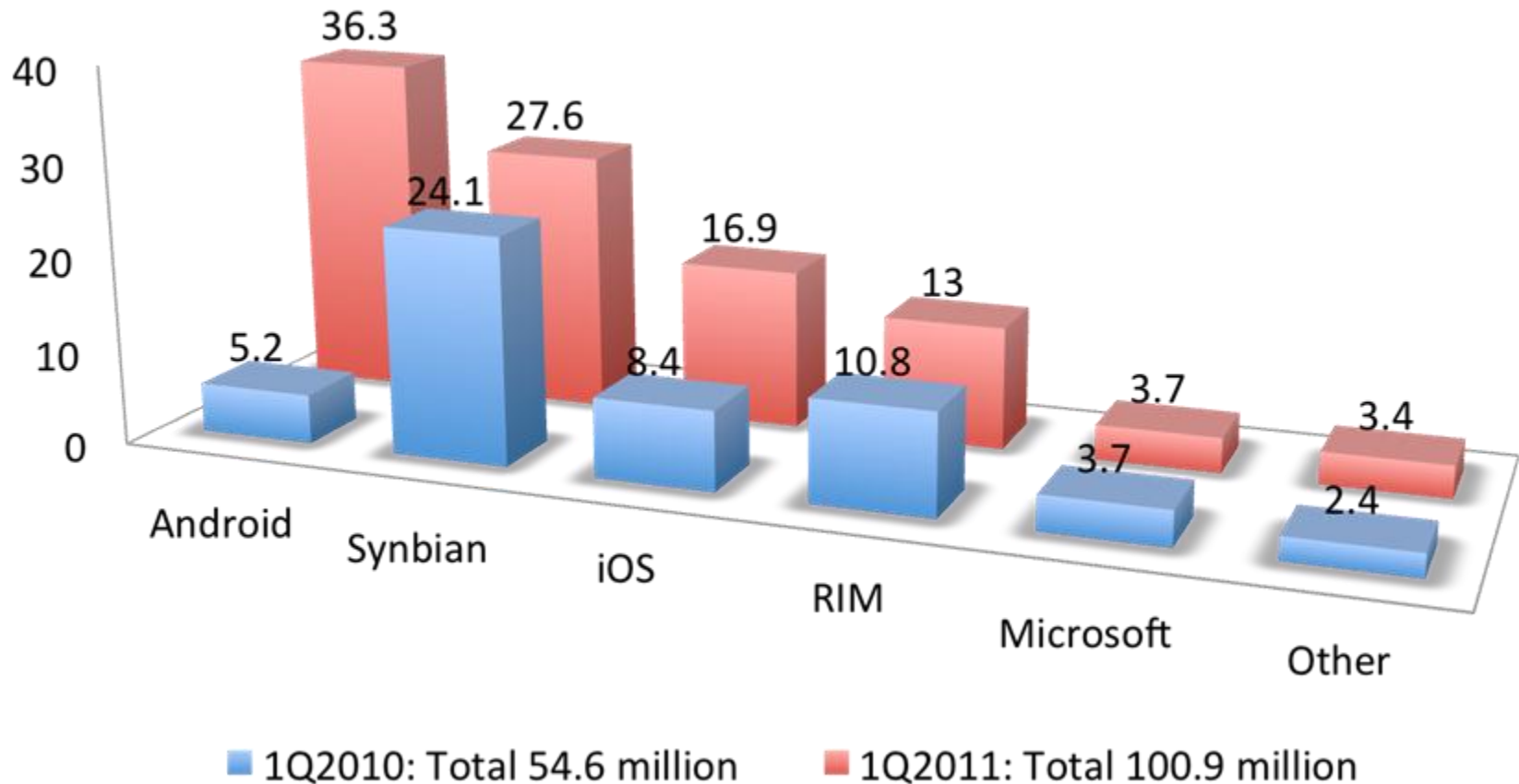
Units in Use Worldwide (millions)



- Personal Navigation Devices
- Factory-installed/In-Dash Navigation Systems
- Navigation-enabled mobile phones

³Source: CENS

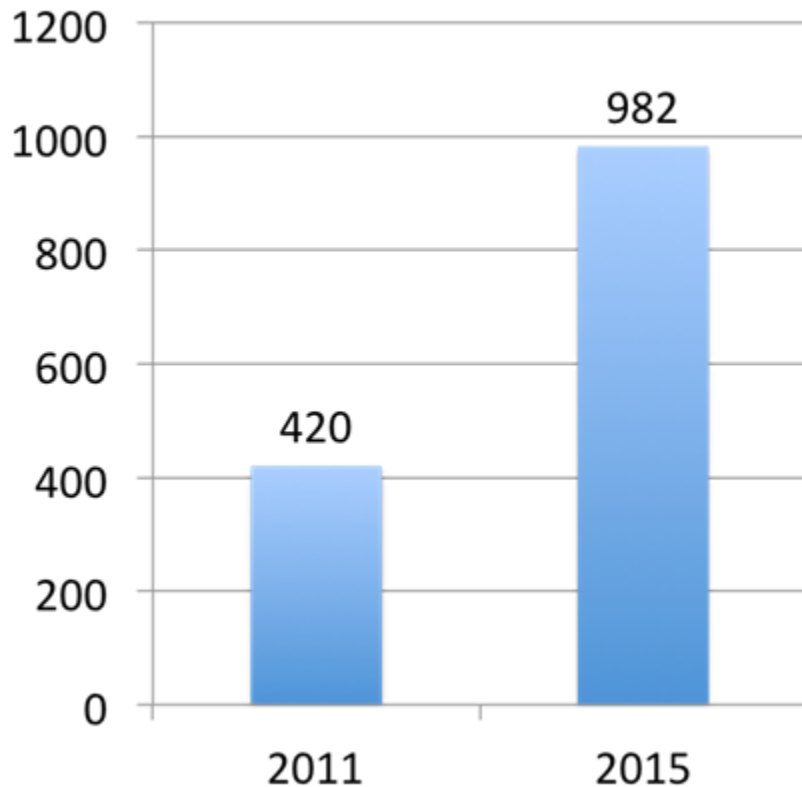
Worldwide Smartphone Sales by OS



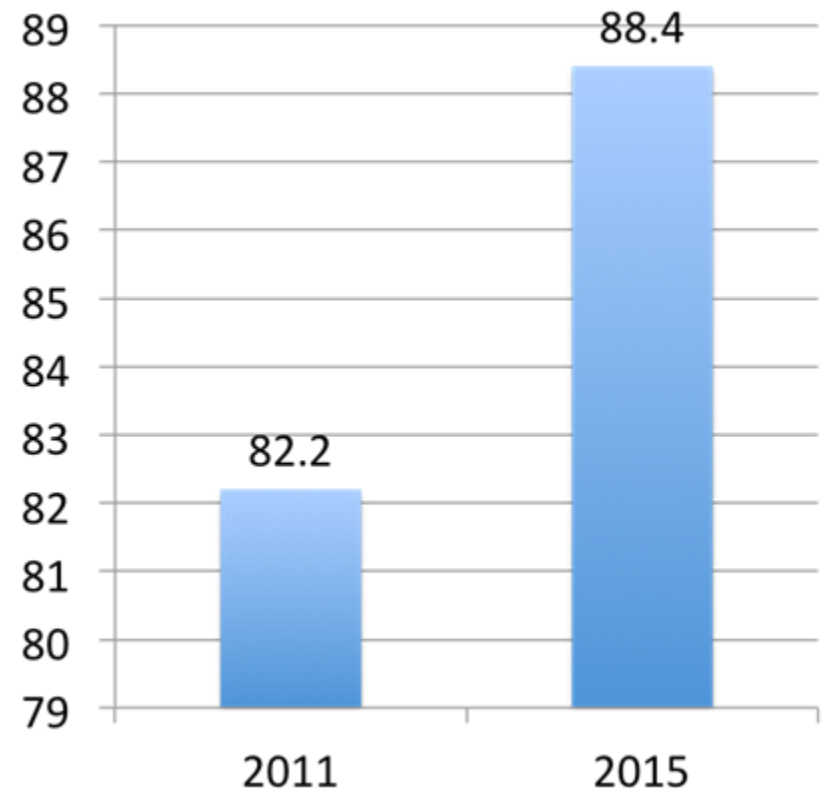
⁵Source: Mashable Tech

Trends in Smartphone Sales

Projected Worldwide Smartphone Sales
(Millions of units)



Projected US Smartphone Sales
(Millions of units)



¹Source: Email Marketing Reports

Competition

	RoadNet	INRIX	TomTom	Sygie	RAC Traffic Plus (UK)	Traffic.com	Beat The Traffic
Mobile App	x	x	x	x	x	x	x
Android Support	x	x		x	x		x
iPhone Support	x	x	x	x	x	x	x
Traffic Updates	x	x	x	x	x	x	x
Real-time Traffic Notifications	x	x	x	x		x	x
Virtual Checkpoints	x						
Accident Notification	x	x			x	x	x
Time Predictions		x	x	x			x
GPS Navigation Routing			x	x			
Emergency Vehicle Detection	x						
Traffic Camera Viewer							x

RoadNet Solution

Goals

RoadNet will improve driver awareness of adverse road conditions.

- Traffic congestion information/analysis
- Real-time traffic update distribution
- Accident/construction site notification
- Virtual checkpoint system to transmit information with minimal data usage

Without RoadNet



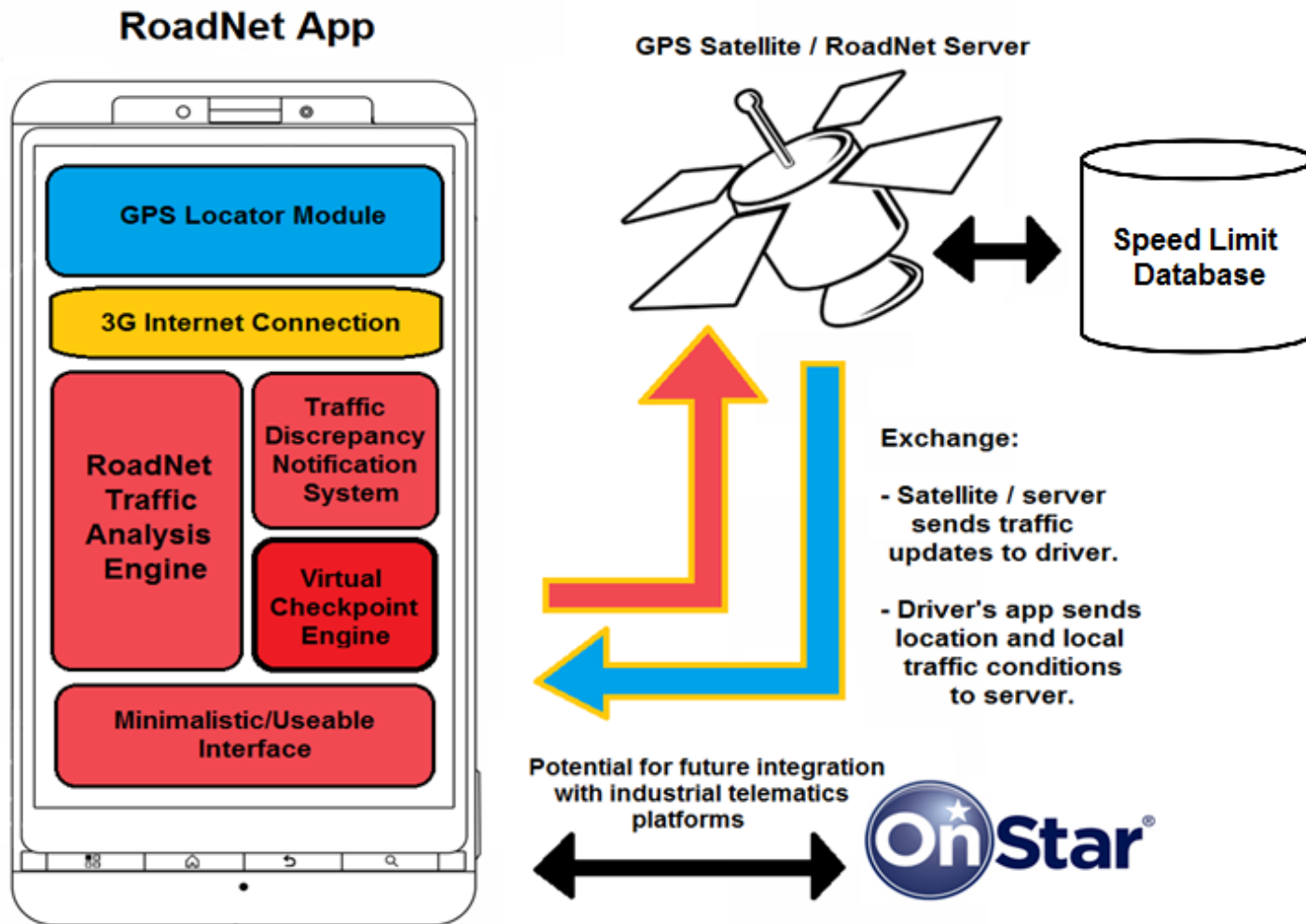
Drivers travel, some even with navigation devices, yet get stuck in unpredicted congestion.

With RoadNet



- ① Vehicles report slower velocities, indicating congestion.
- ② Vehicles indicate ideal velocities at these checkpoints. Along with analyzing time lapse between checkpoints, network determines that a bottleneck exists between checkpoints.
- ③ Vehicles at the checkpoints on this route are near ideal velocity. RoadNet determines this route would be faster than the current route.
- ④ Vehicle passes checkpoint and sends data to network, but also receives notification of congestion ahead and a suggestion for the alternate route.

Major Functional Components



Risk Assessment

		Probability				
		1	2	3	4	5
Impact	5	T1, S1		F2, C4		F1
	4		S2	C1	C3	
	3					S3
	2		T2, T3			
	1		C2			

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 RoadNet 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 RoadNet. 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. RoadNet'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. RoadNet 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. RoadNet, 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.

Conclusion

RoadNet will help decrease the amount of traffic congestion and collisions by providing effective real-time updates on upcoming traffic conditions to a driver before they get there.

With RoadNet's virtual checkpoint system and traffic analysis engine, this will be accomplished in a new way that makes these benefits more accessible to drivers.

References

1. Brownlow, Mark. "Smartphone Statistics and Market Share." September 2011. Email Marketing Reports. Retrieved from <http://www.emailmarketing-reports.com/wireless-mobile/smartphonestatistics.htm>
2. Dr. M. Weigle, interview, October 19, 2011.
3. Liang, Quincy. "Worldwide PND Shipments to Peak Around 42 M. in 2011-2012: Berg Insight." October 19, 2011. CENS. Retrieved from http://news.cens.com/cens/html/en/news/news_inner_38131.html
4. Lomax, Time, David Schrank and Shawn Turner. Texas Transportation Institute. (2011). Annual Urban Mobility Report. College Station, TX. Retrieved from <http://mobility.tamu.edu/ums/>
5. Schroeder, Stan. "Smartphone Sales Up 85% Year-Over-Year." May 19, 2011. Mashable Tech. Retrieved from <http://mashable.com/2011/05/19/smartphone-sales-q1-2011-gartner/>
6. U.S. National Highway Traffic Safety Administration, Traffic Safety Facts. Retrieved from <http://www.census.gov/compendia/statab/2012/tables/12s1108.pdf>

Competition App Reference Links:

Beat The Traffic:

<http://itunes.apple.com/us/app/beat-the-traffic/id339660839?mt=8>

Sygie:

<http://www.sygie.com/en>

INRIX:

<http://www.inrix.com/mobile.asp>

TomTom:

http://www.tomtom.com/en_gb/products/mobile-navigation/tomtom-app-for-iphone/

RAC:

<http://itunes.apple.com/gb/app/rac-traffic-plus/id389339076?mt=8>

Traffic.com:

<http://itunes.apple.com/us/app/traffic.com/id327245871?mt=8>