



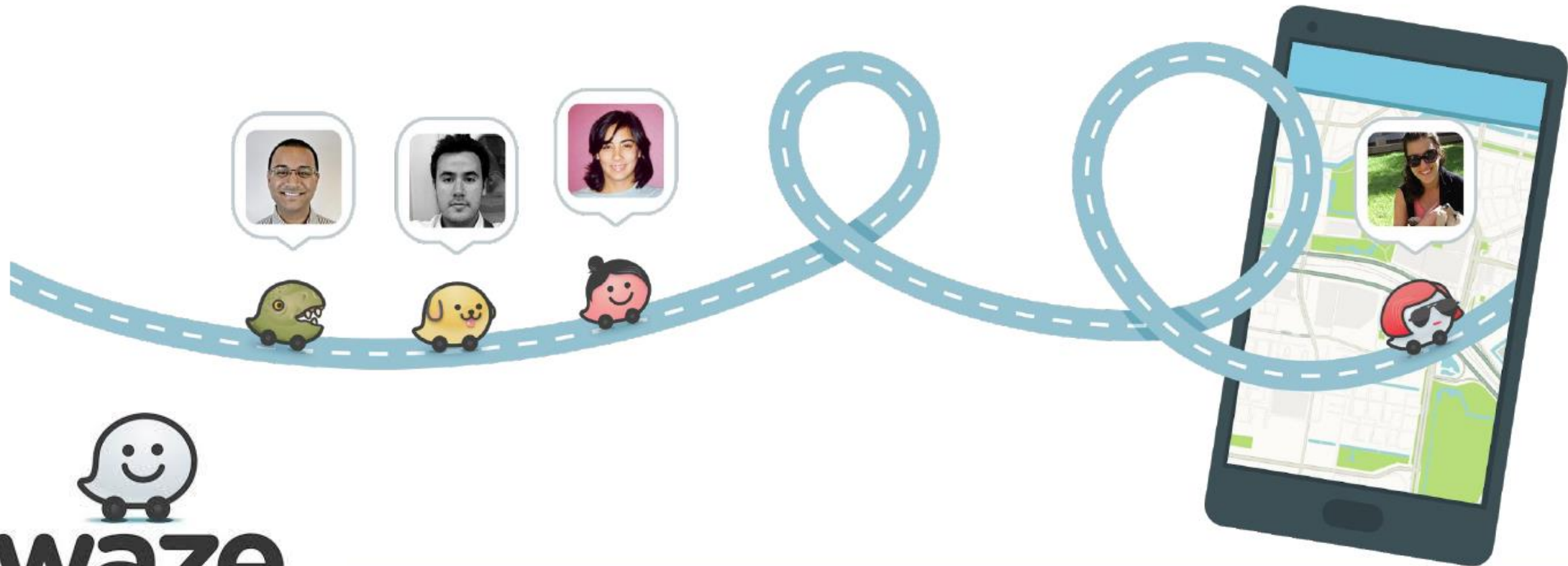
# Intelligent Transportation Systems

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Rolland Vida, BME TMIT

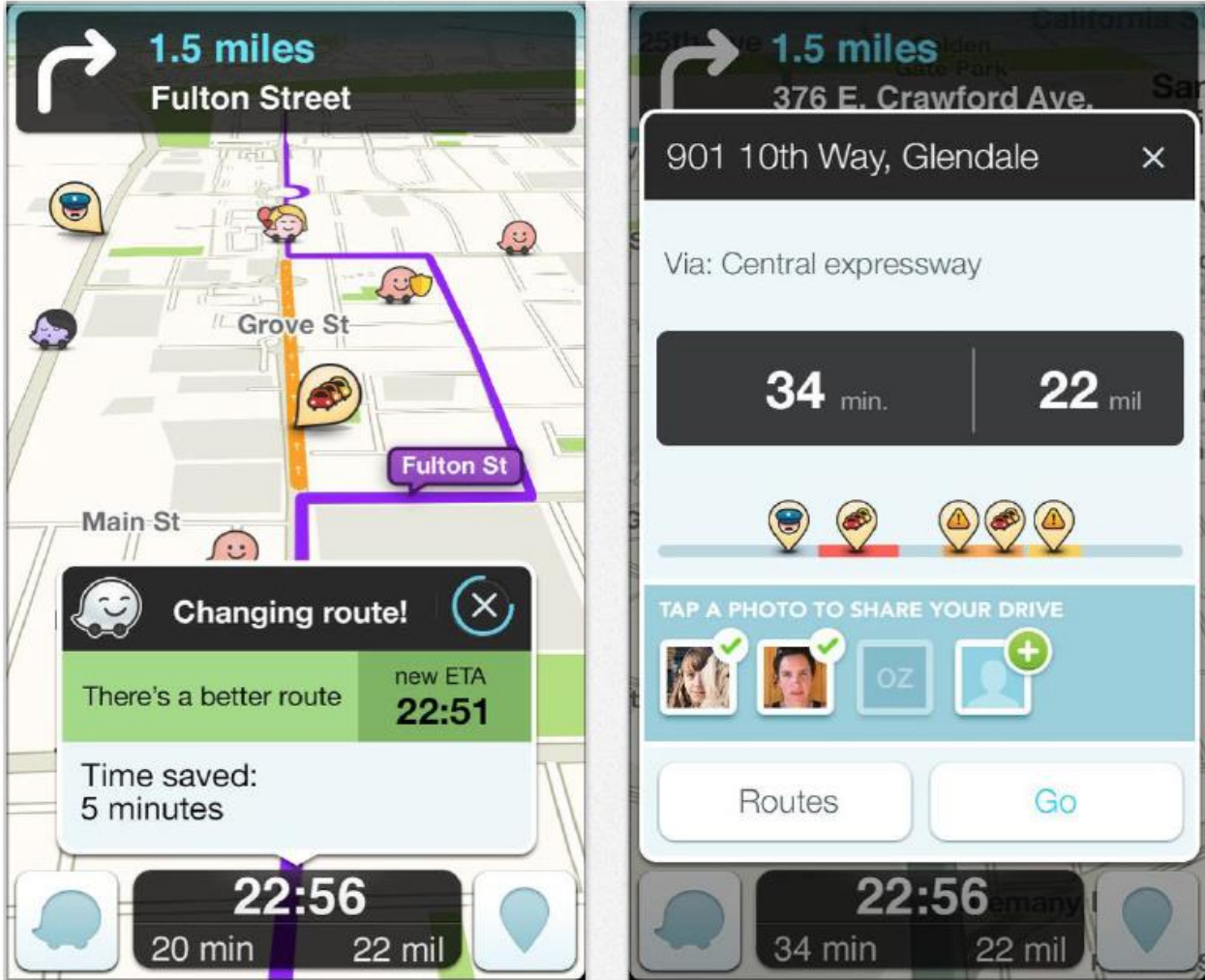
# Waze...

is a social GPS, MAP, NAVIGATION system which drives you from A to B based on real-time traffic data avoiding jams, dangerous intersections, hazards.





# Waze Mission

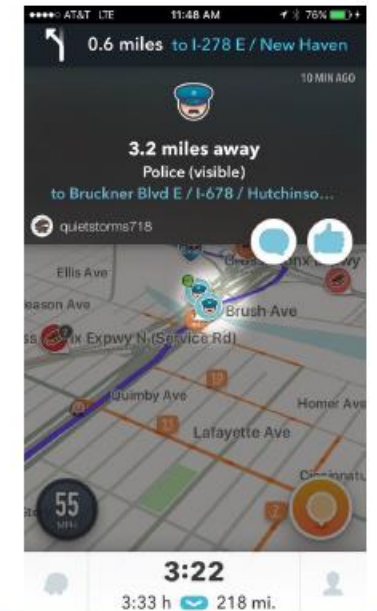
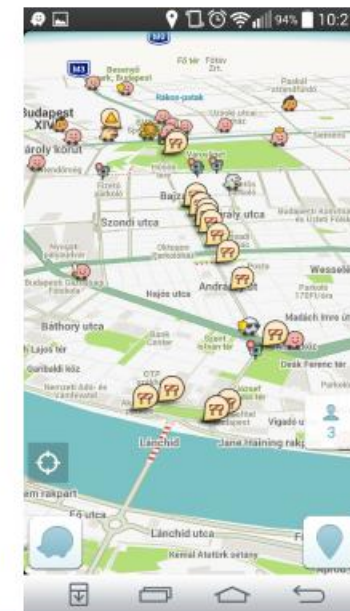
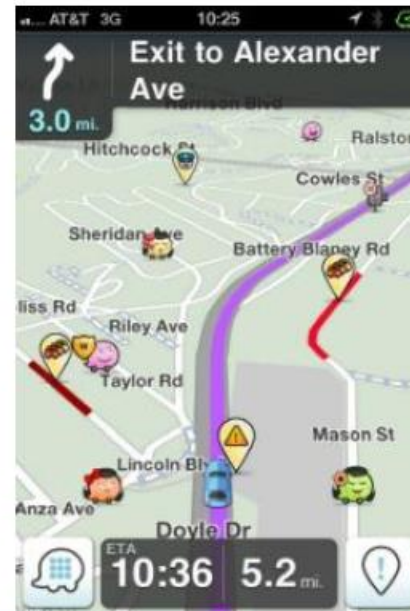


Save 5  
minutes/day  
every day for  
every driver



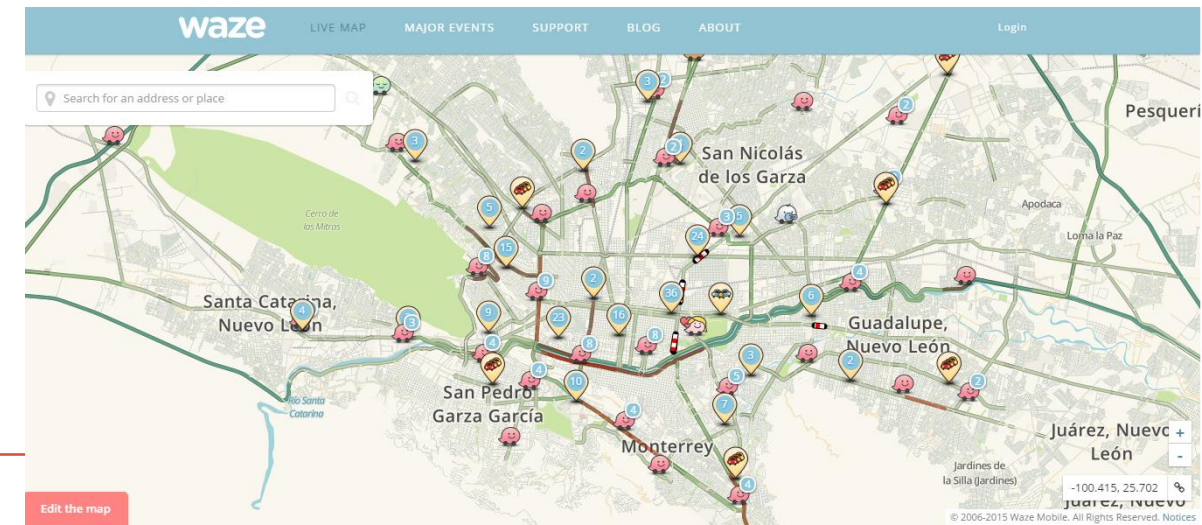
# Waze – the story

- 2006 – FreeMap Israel – Ehub Shabtai
- 2008 – Waze – Ehud Shabtai, Amir Shinar and Uri Levine
- 2010-2011 – raised funding of about 55 million USD
- 2013 – Bought by Google for 1 billion USD



# How Waze works?

- **Original problem:** digital maps used by navigation softwares are rapidly getting outdated
  - E.g., when a new highway or a new bridge is built
  - Usual updates after 6 months or more, and for a (quite high) fee
- **Idea:** use the **GPS data of drivers running the mobile app**
  - Where there are cars, there should be a road
  - Roads not added automatically, but manually, by editors
  - Tile updates each 1-2 days
  - Vector-based map with minimal data





# How Waze works?

- **Why not using the data for navigation?**
  - Frremap Israel -> Waze
- **Static data:**
  - Digital map, POI (Points of Interest) database
  - Segment drivethrough times (/hour, /day, /month + holidays)
- **Dynamic data:**
  - Real-time drivethrough times from other drivers
  - Current closures
- More users, more data, more precise ETA (Estimated Time of Arrival)
- **Passive and active contribution**
  - Only a small subset of users submit active reports





Hidden  
Visible

Light  
Heavy  
Standstill

On Road  
On Shoulder  
Weather

Major  
Minor

Speed  
Red Light  
Fake

# ACTIVE REPORTING

50M+ REPORTS PER MONTH

# Community

**Drivers**

>75 m



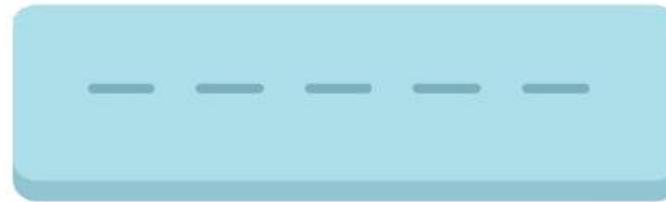
**Reporters**

>10 m



**Editors**

>700.000



**Champs**

156





# Numbers

50 m wazer and 500.000 editor drove 49.1 b kms and sent 459 m reports

## Country toplist:

- |                  |                 |
|------------------|-----------------|
| 1. United States | 7. Indonesia    |
| 2. Brazil        | 8. Mexico       |
| 3. Malaysia      | 9. Chile        |
| 4. France        | 10. Italy       |
| 5. Israel        | 11. Philippines |
| 6. Colombia      | 12. Costa Rica  |

## Reports:

243M



105M



56M



12M



4M



4M



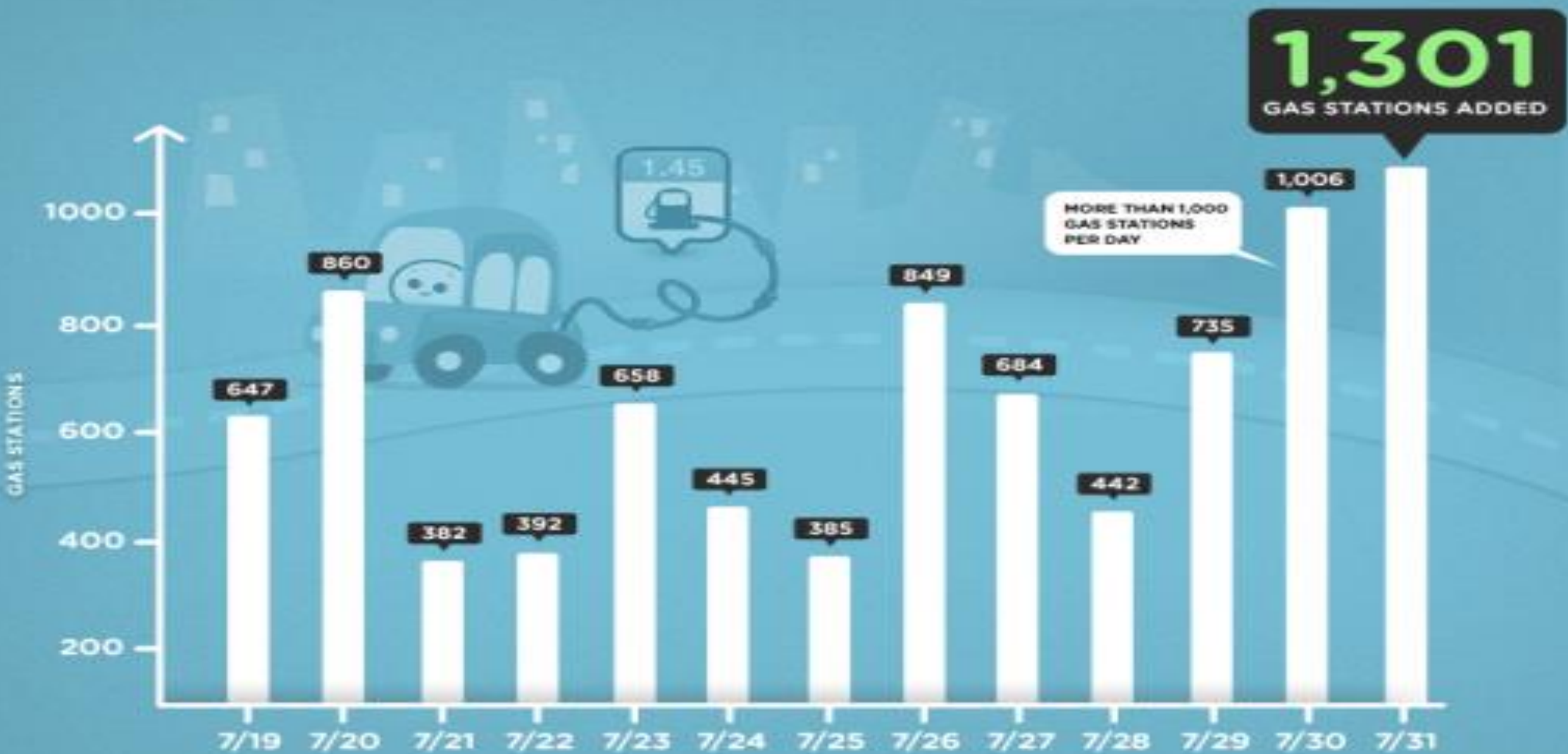
## Partners:

**100+ Broadcasters**

**100 CCP**

**8 Mobile carriers**

# GAS STATIONS ADDED PER DAY







**Valuable time and money lost :**

## **Cost of traffic**

**KL : 1.1% to 2.2% of GDP annually (USD\$ 3 - 6B)**

**Jakarta : USD\$ 5B annually**

**Manila : USD\$ 2.4B annually**



# Waze and CCP

The closure and event information is provided by the primary source, the government  
Traffic data helps the government to monitor, analyze and plan traffic





**WAZE**  
Anonymous, real-time, Wazer-generated incident and slow-down information



**MUNICIPAL PARTNERS**  
Advanced and real-time road closures, construction, major traffic events and incidents

- TRAFFIC
- ACCIDENTS
- HAZARDS

- SPORTS
- CONSTRUCTION
- HOLIDAY/FESTIVAL
- VIP VISIT
- CRISIS /NATURAL DISASTERS
- EXTREME WEATHER CONDITIONS
- PROTESTS

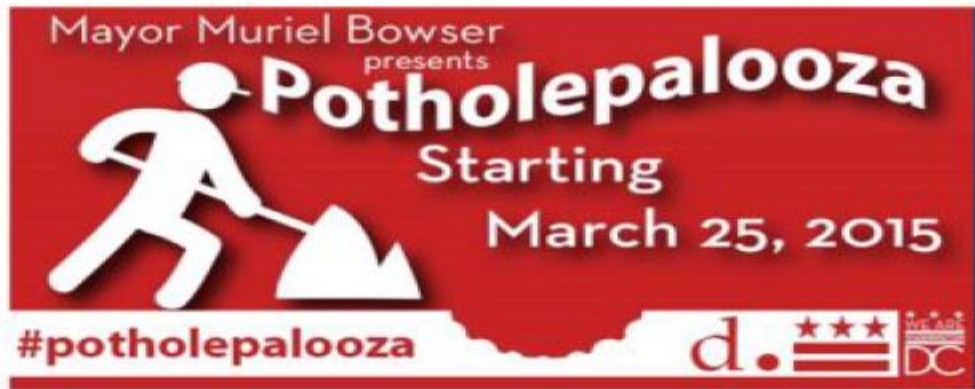


# W10 AND CONNECTED CITIZENS REVEAL

- **15 partners:** Iowa, Florida, Jakarta, Rio, LA, Sydney, Boston, WDC, Tel Aviv, Costa Rica, Kentucky, Oregon, Barcelona, Latvia, Budapest (2014)
- generated **1 b media impressions** in 24 hrs
- Today hundreds of cities in the CCP program







## District Department of Transportation

- DDOT Home
- DDOT Services
- Projects and Planning
- On Your Street
- About DDOT

District Department of Transportation



**Office Hours**  
Monday to Friday, 8:15 am to 4:45 pm

**Connect With Us**  
55 M Street, SE, Suite 400,  
Washington, DC 20003  
Phone: (202) 673-8813  
Fax: (202) 671-0650  
TTY: (202) 673-6813  
Email: [ddot@dc.gov](mailto:ddot@dc.gov)



**Ask the Director**  
Agency Performance  
**Language Support**  
Amharic (አማርኛ)  
Chinese (中文)  
French (Français)  
Korean (한국어)  
Spanish (Español)  
Vietnamese (Tiếng Việt)

Listen

SHARE Text Resize

Wednesday, March 25, 2015

### Mayor Bowser and DDOT Launch Potholepalooza Campaign, the District's "War on Potholes"

Annual campaign will expedite pothole repairs across the District

(Washington, DC) – Today, Mayor Muriel Bowser and District Department of Transportation (DDOT) Director Leif Domsjo kicked off the District's annual Potholepalooza, the District's "war on potholes" campaign to accelerate pothole repair time on roadways across the District. The event was part of Mayor Bowser's Pathways to the Middle Class Tour, a week-long effort leading up to Mayor Bowser's March 31 State of the District Address to highlight ways the Administration is helping to create Pathways to the Middle Class for DC residents.

"Today we are taking a fresh approach to pothole repairs in the District," said Mayor Bowser. "By adopting new strategies and technologies we are better able to identify potholes, repair them quickly and ensure residents can drive on District roads that are smooth, comfortable, and most importantly, safe."

Although today's event officially launched the Potholepalooza campaign, DDOT has already filed nearly 7,300 potholes in the last two weeks. Mayor Bowser and Director Domsjo helped fill potholes on Joliet Street, SW, in Ward 8, as DDOT crews mobilized for the spring season campaign.

This year's Potholepalooza will run throughout the spring season until all potholes are filled. As part of the campaign, DDOT will add extra crews to fill potholes, with the goal of repairing identified locations within 48 hours. The normal day-to-day response time is within 72 hours.

goDCgo



Your #1 resource for transportation information & options to make getting into and around the District easier than ever.

DC Streetcar



DC Streetcar will facilitate travel for District residents, workers and visitors by complementing existing transit options, and by creating neighborhood connections where they currently do not exist.

Way to Wazell



DDOT DC @DDOTDC

Another #potholepalooza factoid, the total Waze pothole-related reports are 10,202. You are rocking this. Keep them coming.

Mar 30, 2015, 1:21 PM

Don't have a Twitter account yet?  
Sign up today and follow DDOT DC.

Join Twitter

Tweets

Follow

Expand



**DDOT DC**  
@DDOTDC

9h

Between last week Sunday and this Sunday, DDOT has filled nearly 7,600 potholes.

#potholepalooza

Expand



# BUILDING SMARTER PARTNERSHIPS

Partnering with Waze enables DOTs to:

1. **Respond** to incidents in real-time
2. **Analyze** Waze data to make smarter transportation decisions
3. **Create direct communication channel** between governments and citizens





# Integrating Waze data into traffic operations

- Integrate data into traffic management centers
- Surface alerts as they occur
- Respond to accidents in real time

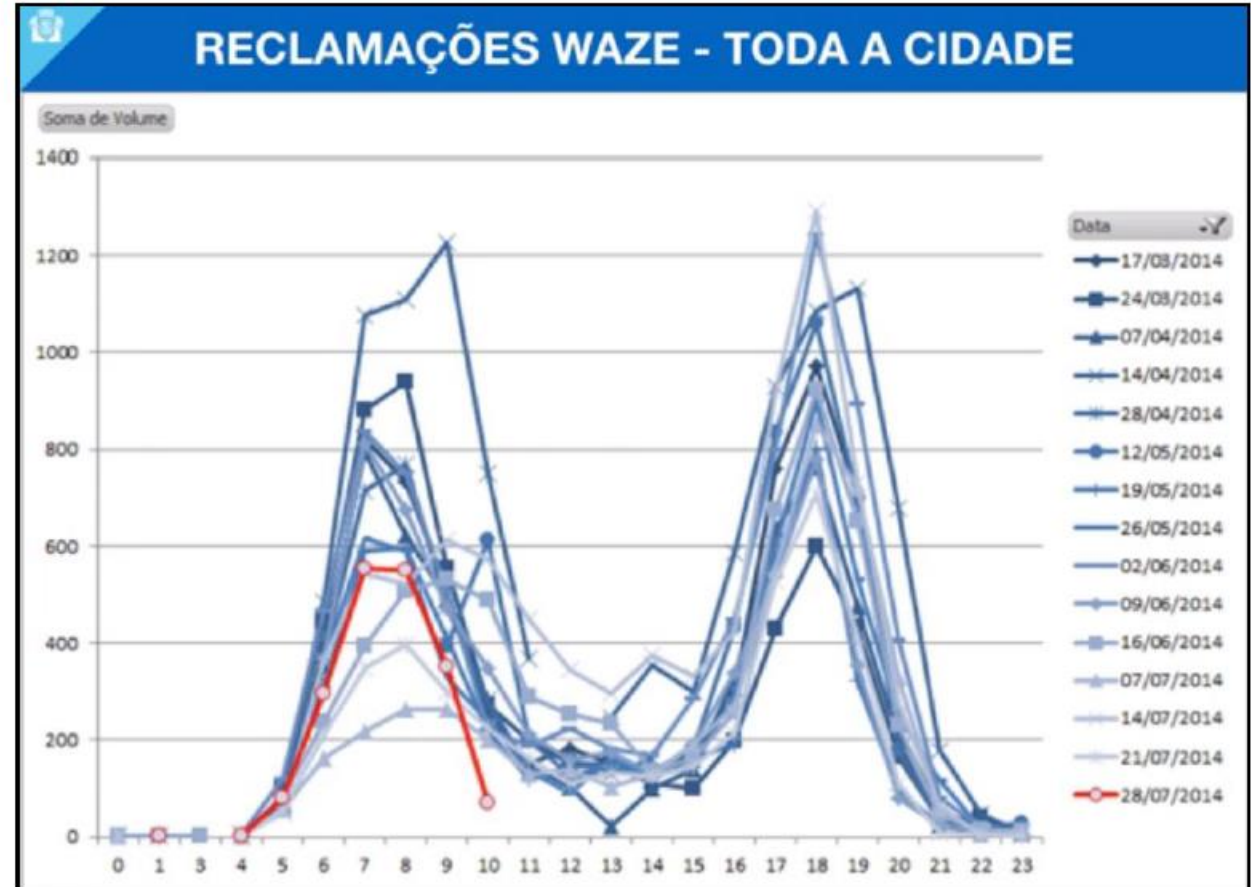
A screenshot of the Rio de Janeiro City Operations Center's web-based interface. The browser address bar shows the URL: [geoportal.cor.rio.gov.br/geoportal/index.cfm?CFID=13c0fc7a-f953-4118-8012-d9d6050da190&CFTOKEN=0](http://geoportal.cor.rio.gov.br/geoportal/index.cfm?CFID=13c0fc7a-f953-4118-8012-d9d6050da190&CFTOKEN=0). The interface features a top navigation bar with the 'RIO PREFEITURA' logo and a 'CENTRO DE OPERAÇÕES' label. A large banner at the top displays a green alert: 'SENHORES OPERADORES; O MUNICÍPIO ESTÁ EM ESTÁGIO DE VIGI... JBLADO, AS TEMPERATURAS ESTARÃO EM SUAVE ELEVACÃO, COM M...'. Below this, there are tabs for 'Área de trabalho: Principal' and 'Abrir'. The main content area is divided into several sections: a left sidebar with a 'Camadas' (Layers) menu listing various data sources like 'COR - base de conhecimento', 'CETRIO - Câmeras', and 'CONCESSIONARIAS - Light'; a central map area showing a 3D view of Rio de Janeiro with numerous colorful Waze markers and traffic data overlays; and a right sidebar with a list of 'Incidentes' (Incidents) including details like '30/08/2014 - 11:07' and 'Ocorrências de Trânsito'. At the bottom, there are additional controls for 'Datamining Geoespacial' and 'Detalhamento'.



# DATA ANALYSIS: MEASURING INCIDENT LEVELS

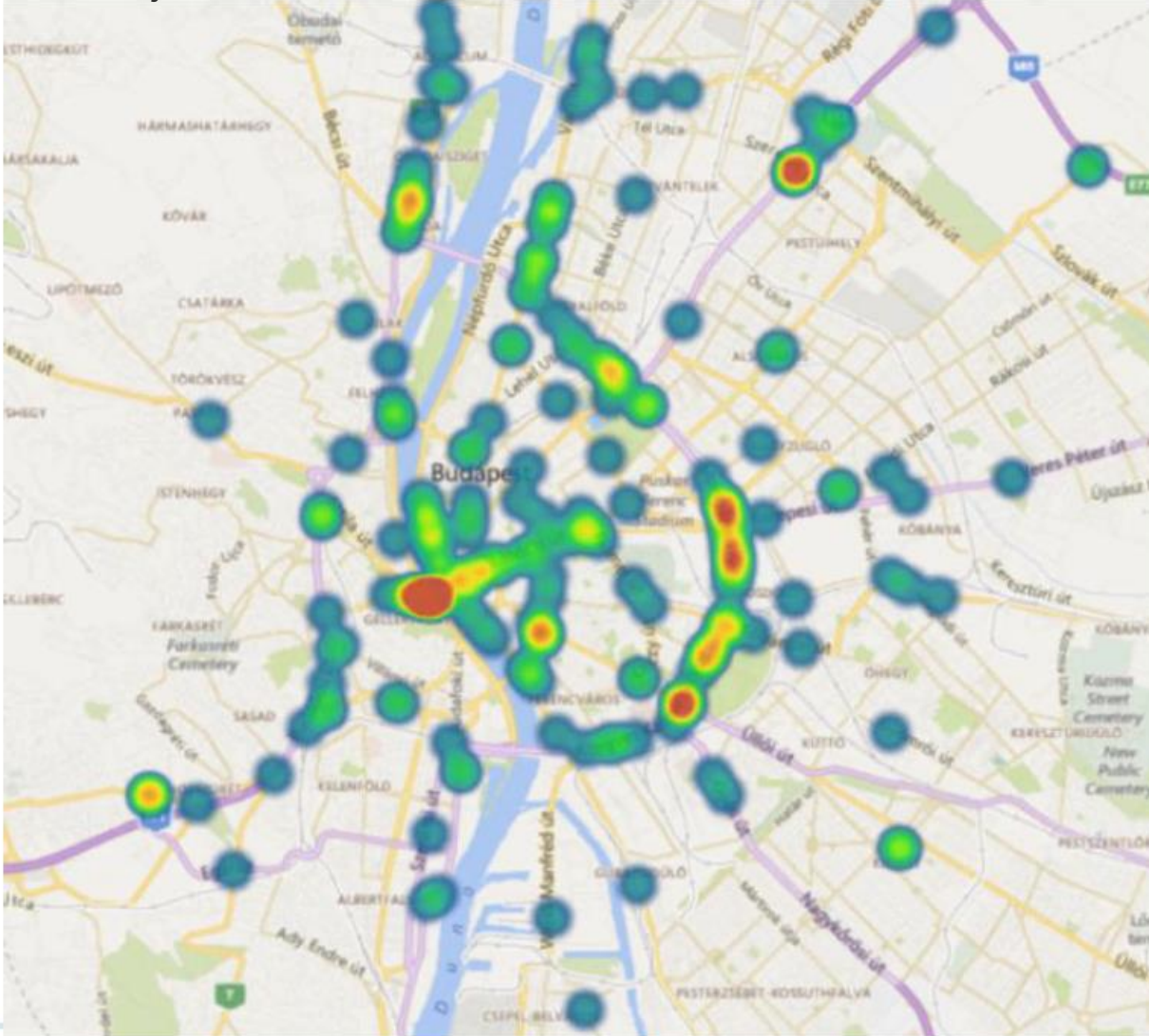
Analysis of Waze incident data can:

1. **Compare congestion levels over time and across neighborhoods**
2. **Identify traffic-prone areas**
3. **Determine impact of major road closures or other traffic events**
4. **Evaluate traffic management approach to repeated events**
5. **Assess deployment of traffic management personnel**

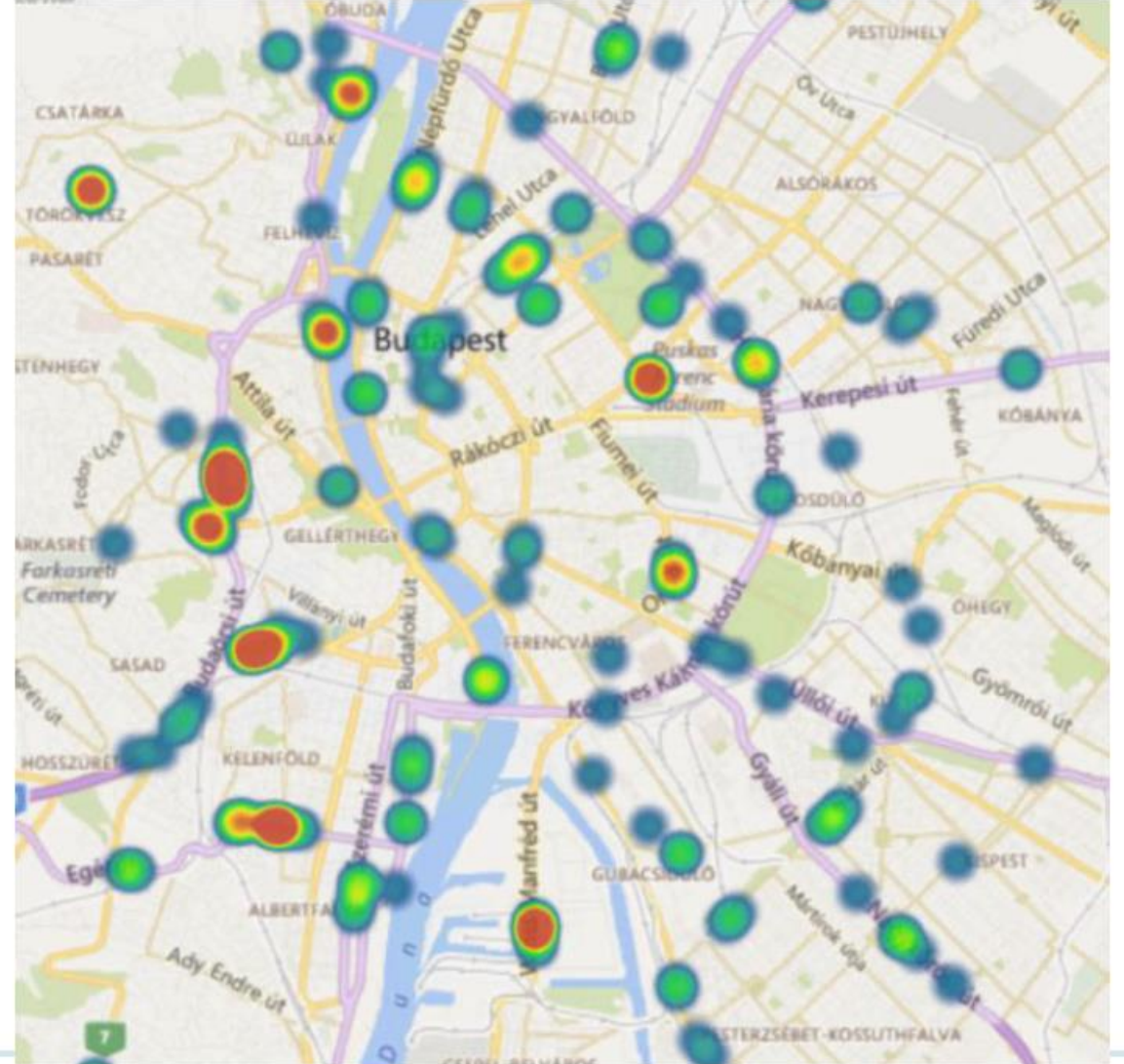


# Prioritize tasks with heat maps

Traffic jams



Accidents

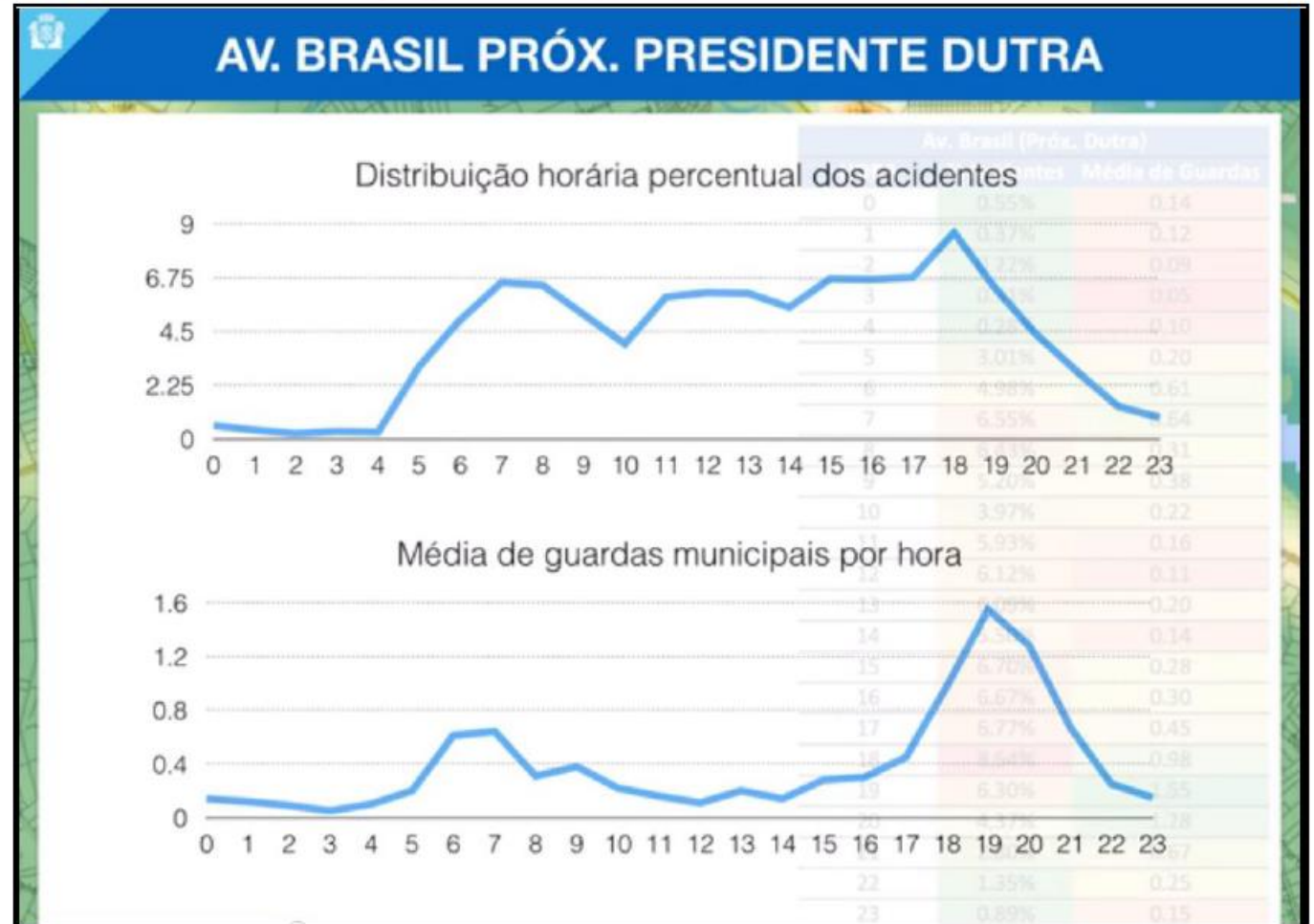




# HOURLY CHANGES IN INCIDENT REPORTING

Waze data identifies accident-prone times of day per region

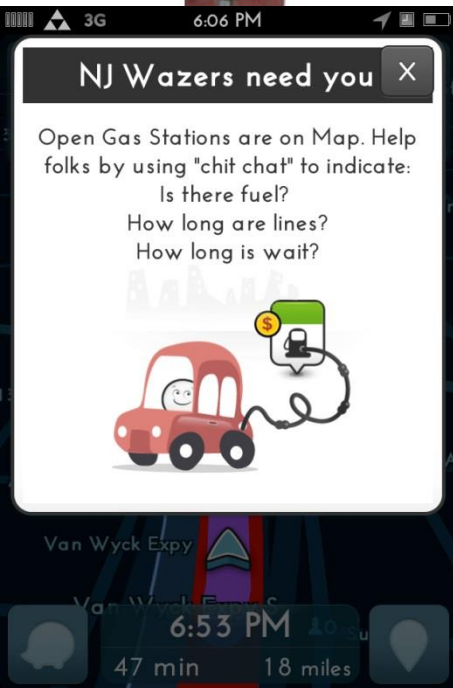
- Percentage of **accidents per hour** on a regional basis
- Evaluate corresponding **levels of law enforcement and traffic management personnel** and adjust accordingly





# COMMUNICATION BETWEEN GOVERNMENTS AND WAZERS

New Jersey, Staten Island, Long Island, FEMA: Superstorm Sandy



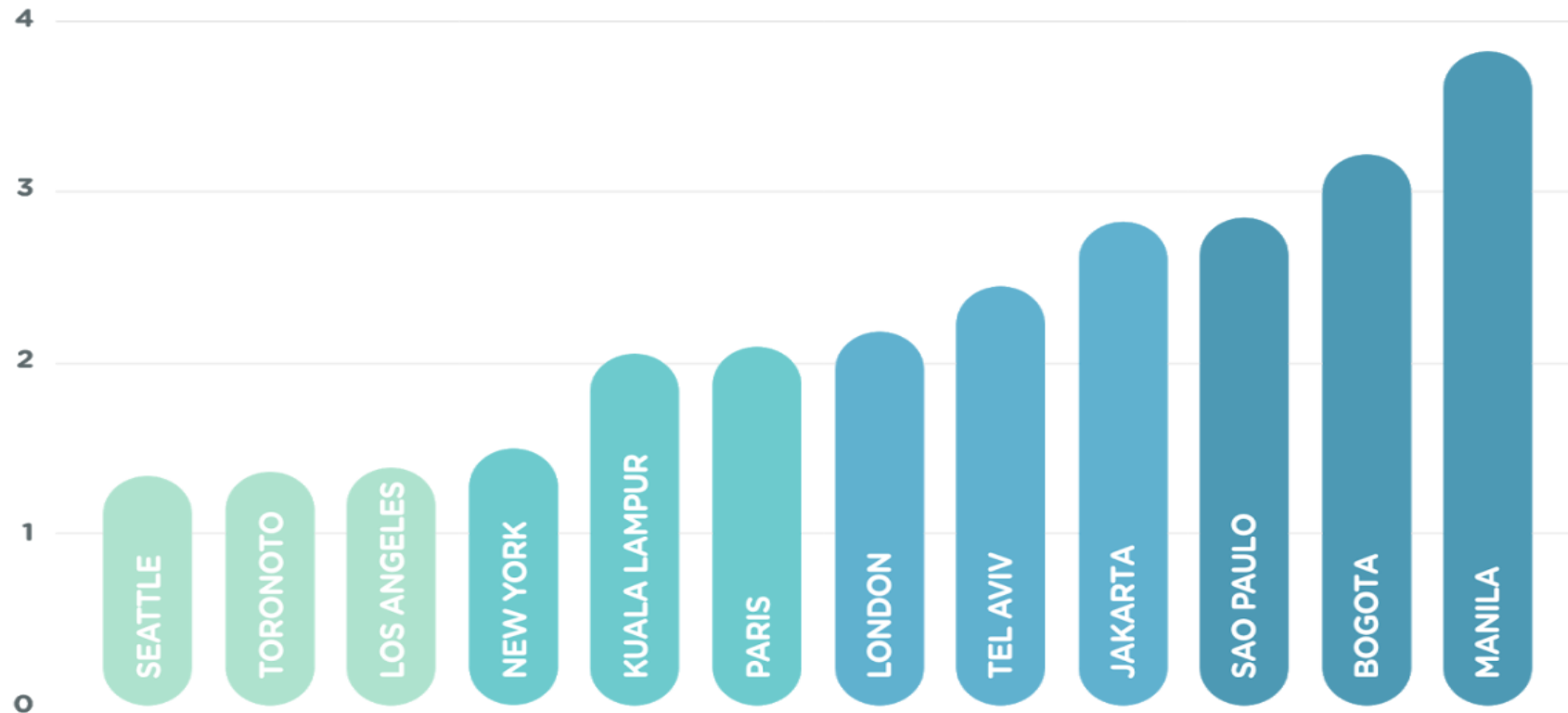
- **Fuel shortage** became a national crisis
- Direct one-off communication to Wazers: **location-based push notification**
- **Tens of thousands** of response
- **FEMA rerouted fuel trucks**

Federal Emergency Management Association (FEMA)

# Comparing cities

## Which city has the worst traffic?

MINUTES PER KILOMETER

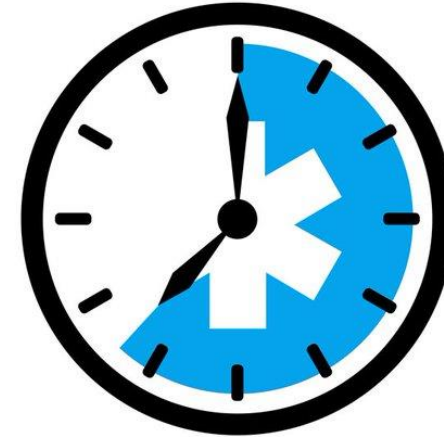


# Waze alerts before 911



**62%**

HOW OFTEN THE  
**WAZE EVENT**  
IS RECEIVED **BEFORE**  
A **911** CALL IS PLACED



**4½**  
**MINUTES**  
HOW OFTEN ON AVERAGE THE  
**WAZE EVENT**  
BEATS THE **911** CALL

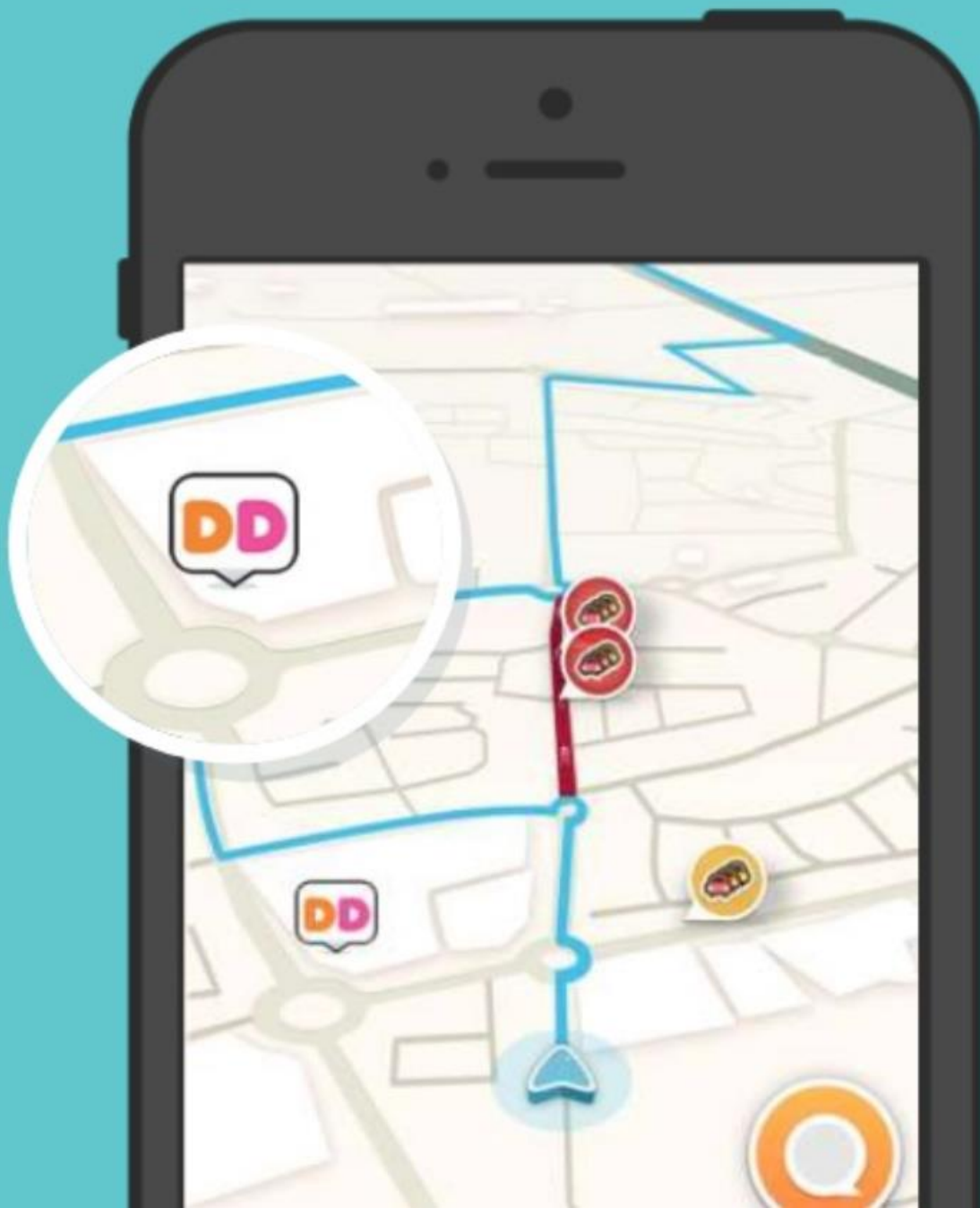






# BILLBOARDS WITH A DIGITAL BACKBONE.



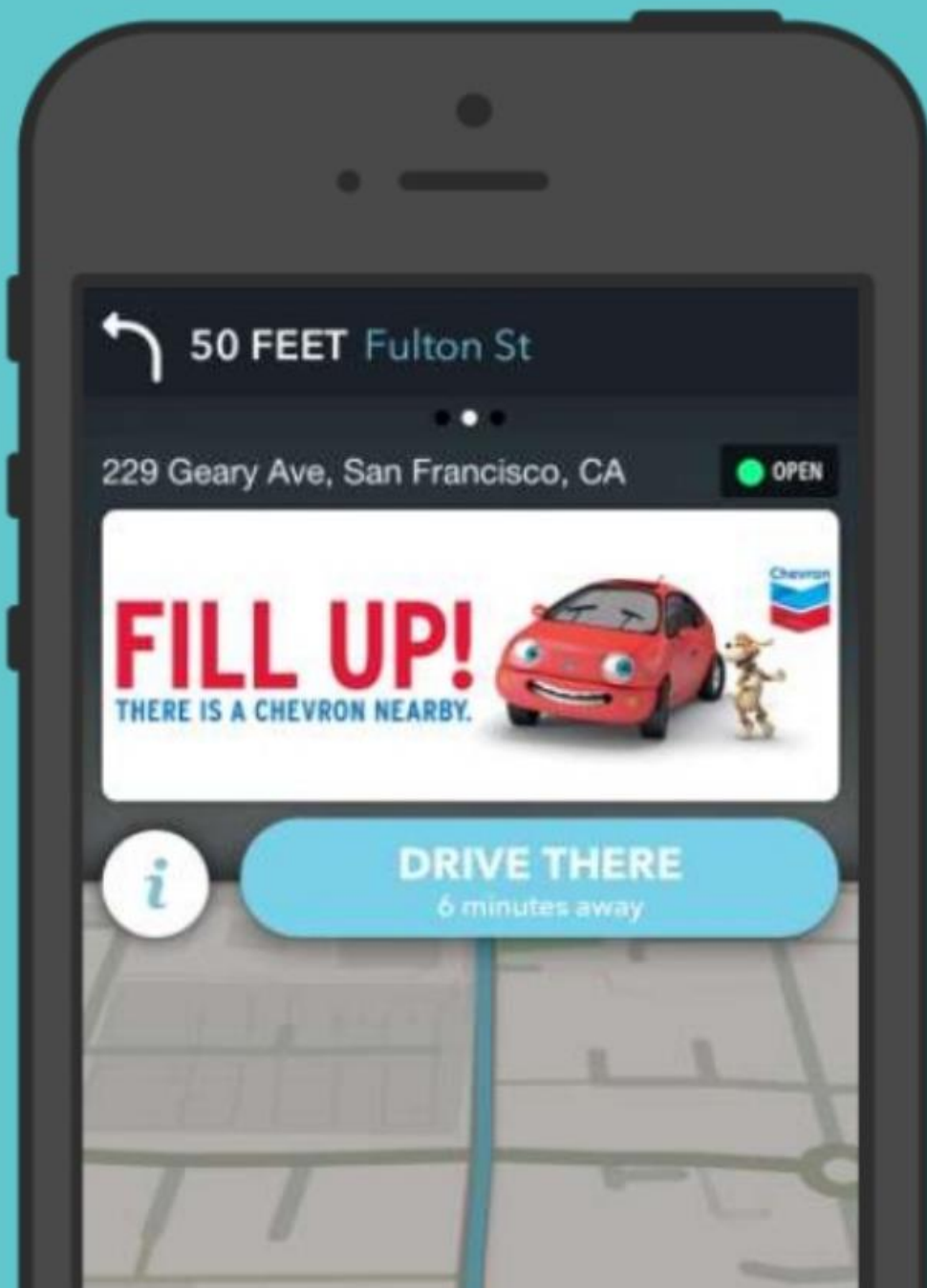


## BRANDED PIN

Waze pins are like digital billboards, educating and reminding drivers of places near their drive.

**\*capped to max 3 pins per screen**

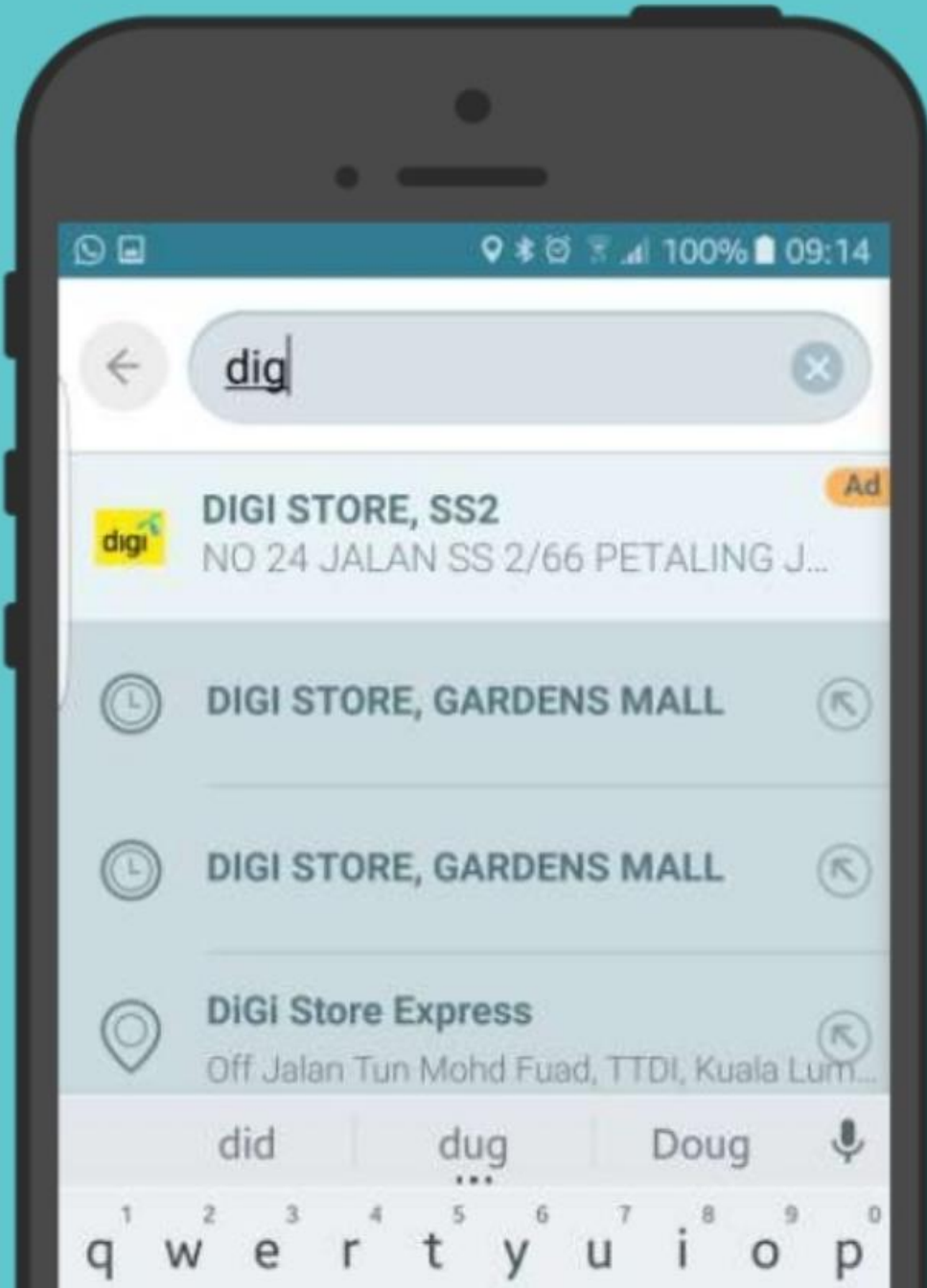




## ZERO-SPEED TAKEOVER

Reach drivers on-the-go with our highest impact ad format.

**\*capped to 4 takeovers per drive**



## SEARCH PROMOTION

Your locations are eligible to show at the top of search results, along with your brand logo, when users search for relevant brand and category terms.



# Criticism to Waze

- Privacy – monitoring the movement of individual people
- Icons and pins distract the attention of drivers from the road
- Complains from the police – their locations are revealed
- Rerouting traffic to small streets
  - Disturbing usually quiet neighborhoods
- No personal driver profile
  - Would be good to propose roads I know
- Brazilian woman killed near Rio
  - the app lead them to a dangerous favela



# Waze vs. Google Maps

- At the beginning, many features of Waze integrated into Google Maps
- Currently some features of Google Maps integrated into Waze
  - E.g., selecting the proper lanes in advance

