

Help Me Help You:

Using Crowdsourced Data, Microservices,
and Agile Methodology for Improving
Operations and Customer Service

Brendan Kaplan
Advantage Engineering



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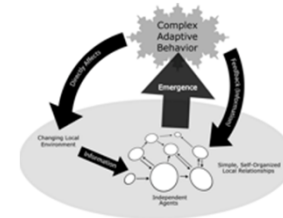
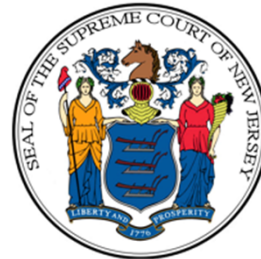
**THE PORT
AUTHORITY
OF NY & NJ**

 **IEEE**
*Advancing Technology
for Humanity*

 | **macmillan**
education



Greener by Design 



AEA

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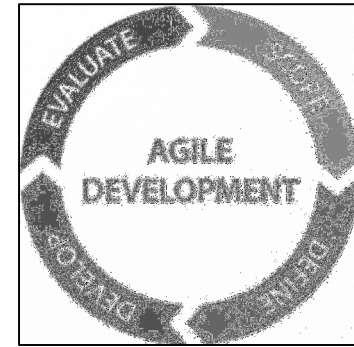
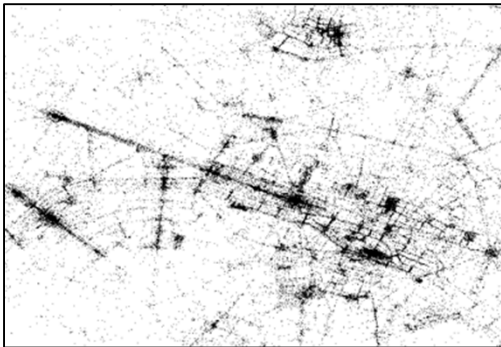


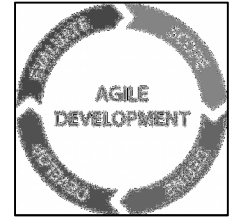
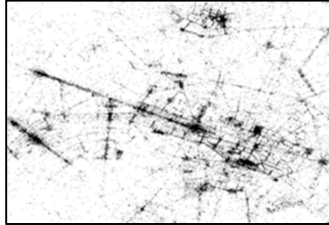


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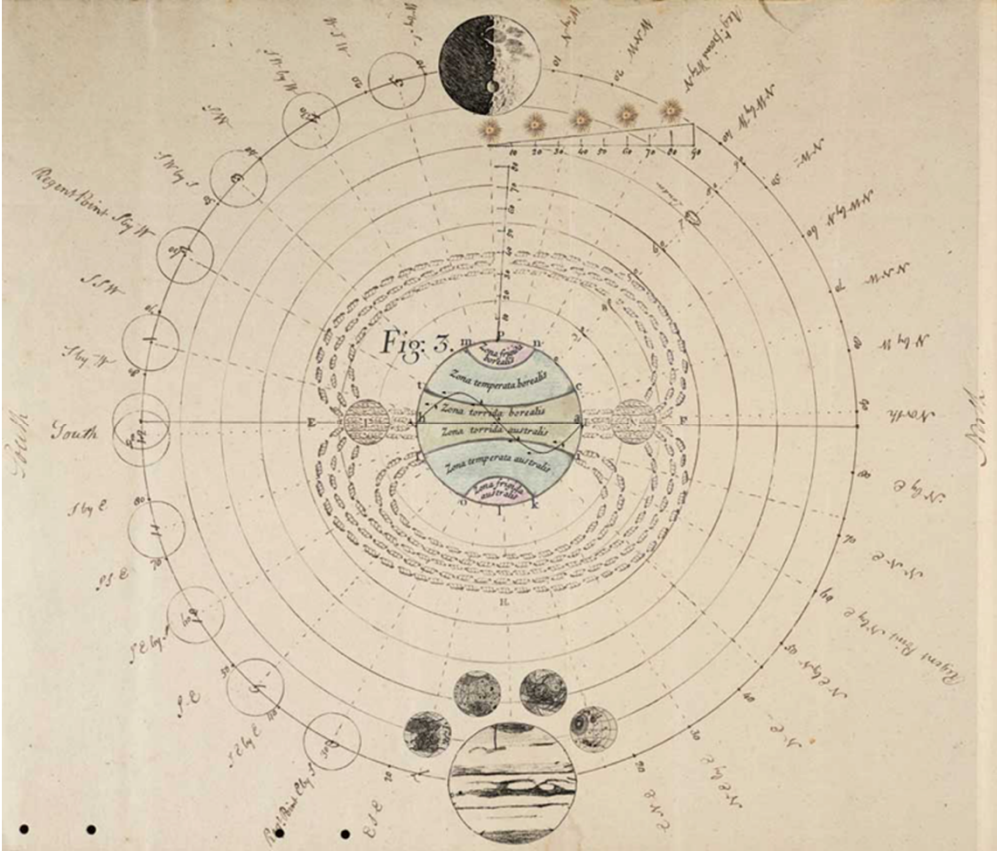


Crowdsourcing



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Crowdsourcing – What it isn't, and what it is



Crowdsourcing – What it isn't, and what it is



Crowdsourcing – What it isn't, and what it is



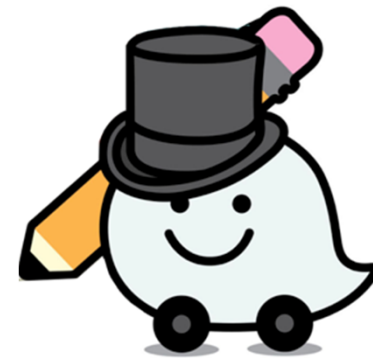
Crowdsourcing – What it isn't, and what it is



How?

Get, Process, Give

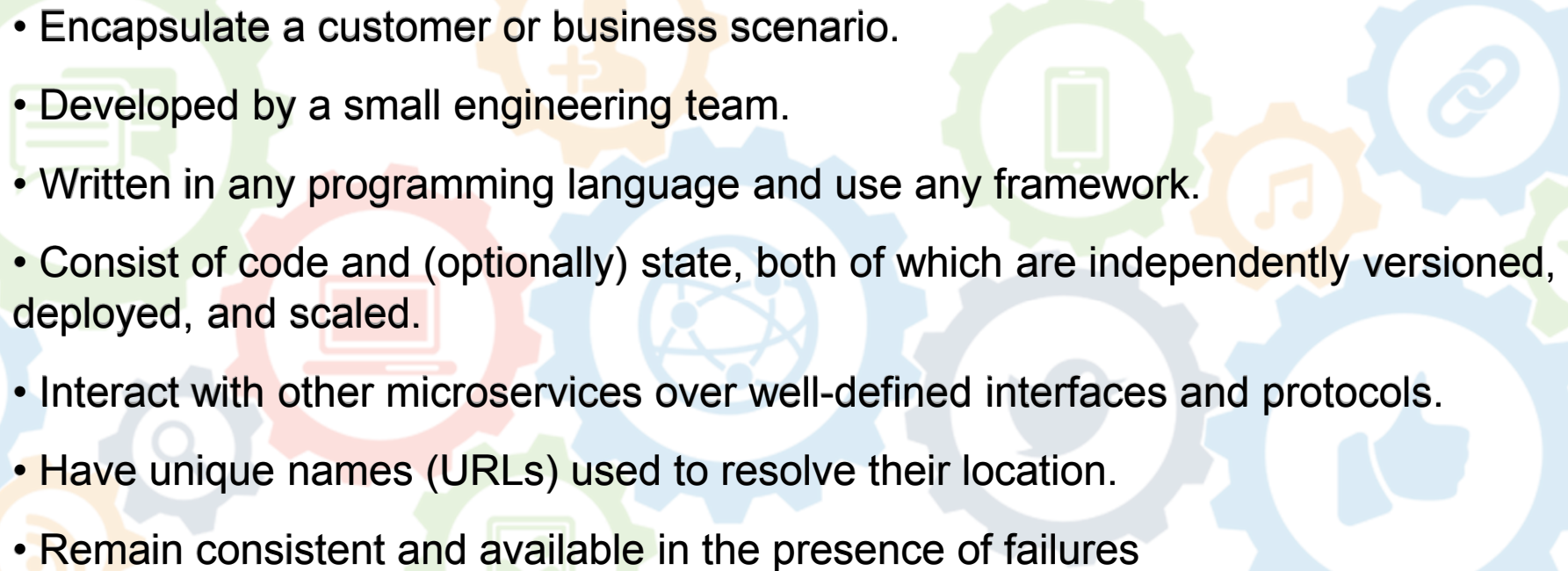




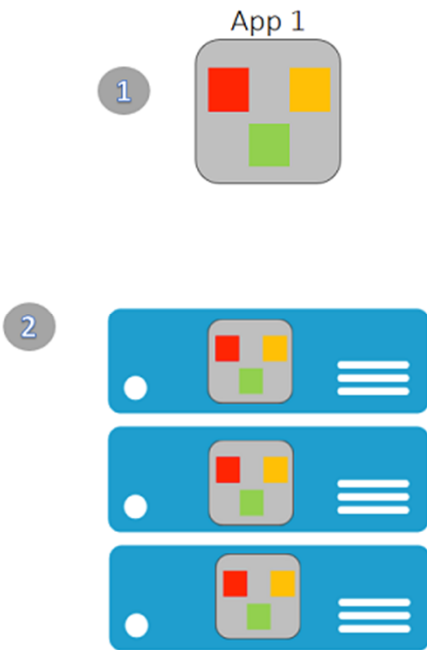
Microservices



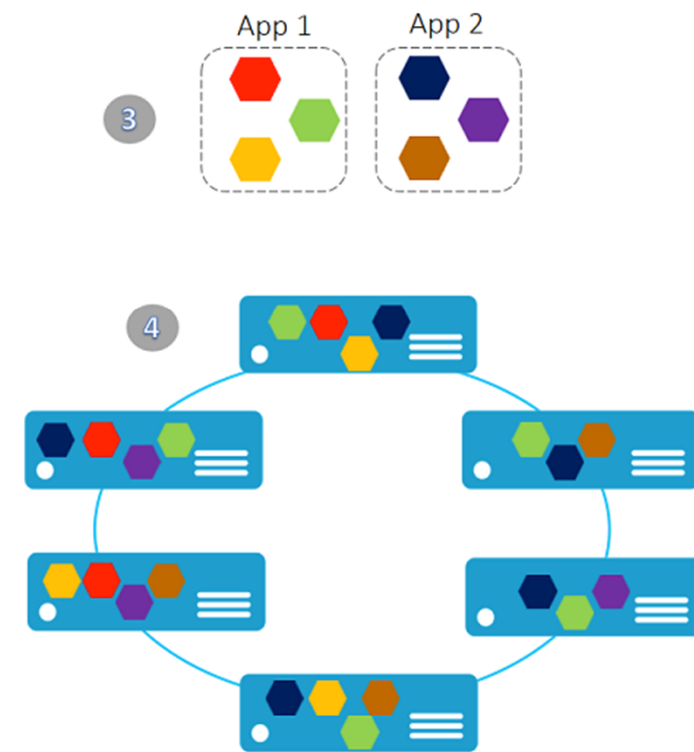
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- 
- Encapsulate a customer or business scenario.
 - Developed by a small engineering team.
 - Written in any programming language and use any framework.
 - Consist of code and (optionally) state, both of which are independently versioned, deployed, and scaled.
 - Interact with other microservices over well-defined interfaces and protocols.
 - Have unique names (URLs) used to resolve their location.
 - Remain consistent and available in the presence of failures

Monolithic application approach



Microservices application approach



Agile Methodology

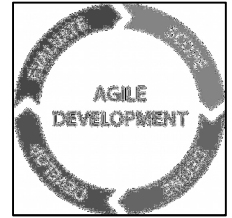
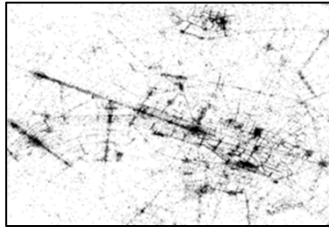


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Scrum Process







Waze: Maintain Situational Awareness



Waze: Aid Customer Navigation



Communicate w/ Customers to Set Expectations and Improve Experience

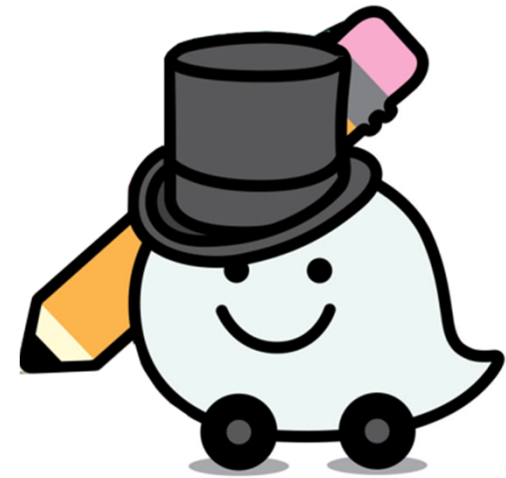
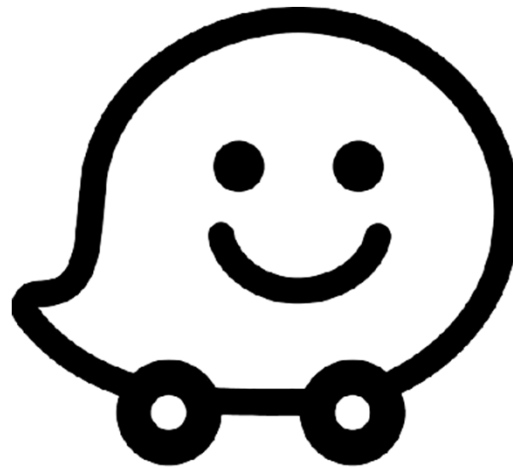


How?

Get, Process, Give



CCP Members – Waze HQ – Map Community



- Ted's Board
- Andy's Board
- Brendan's Board
- Waze Maps
- Technical Work
- Waze Community Board
- Home Base**
- Status Board
- Rizwan's Board
- Farukh's Board
- Partner Responsibility Board
- Kathleen's Board

Home Base

Add gadget Edit layout ...

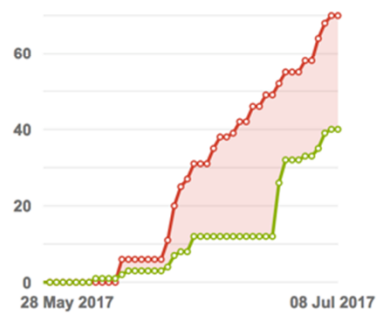
'My Mentions is Past 7 Days' below shows '@Mentions' that are directed towards you in past 7 days.

Filter Results: My Mentions in Past 7 Days

Updated ↓	T	Key	Summary	P
07/Jul/17	<input checked="" type="checkbox"/>	OPS-8	OPS-4 / Give 2nd Account to AOC and LGA MOC + Enter Trips into TrafficView	↑
07/Jul/17	<input checked="" type="checkbox"/>	FEED-1	GTFS Feed for JFK	↑
07/Jul/17	<input checked="" type="checkbox"/>	COM-7	Assist in adding Waze Live map to LGA Website	↑
07/Jul/17	<input checked="" type="checkbox"/>	COM-5	Use Waze as a crash mitigation strategy	↑
06/Jul/17	<input checked="" type="checkbox"/>	CLS-2	Jones Road MTE	↑
03/Jul/17	<input checked="" type="checkbox"/>	WFD-10	WFD-6 / Multiple Usernames CCP Umbrella Feature	↑

Your work graph will appear on top, with text tickets below.

Created vs. Resolved Chart: My Issues



Issues in the last 45 days (grouped daily) [View in Issue navigator](#)

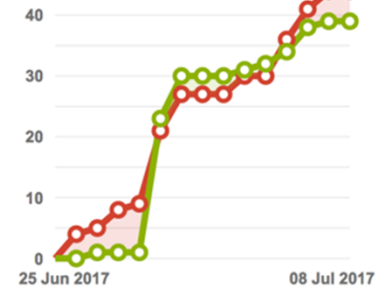
- Created issues (70)
- Resolved issues (40)

Filter Results: My Work

T	Key	Summary	P
<input checked="" type="checkbox"/>	XCOM-3	Confirm movement of Waze DFE integration from dev to production	↑

'Activity Stream' shows recent activity within the system, just like Facebook newsfeed shows all activity from all your friends on FB. Graph on top, text tickets below. Click 'Show More' at bottom of 'Activity Stream' for more items.

Created vs. Resolved Chart: All Issues



Issues in the last 14 days (grouped daily) [View in Issue navigator](#)

- Created issues (44)
- Resolved issues (39)

Activity Stream

Activity Stream



- Ted's Board
- Andy's Board
- Brendan's Board
- Waze Maps
- Technical Work
- Waze Community Board
- Home Base
- Status Board**
- Rizwan's Board
- Farukh's Board
- Partner Responsibility Board
- Kathleen's Board

Status Board

Add gadget Edit layout

Filter Results: Status: To Do

Key ↑	P	T	Summary
ANY-3	↑	<input checked="" type="checkbox"/>	Analyze TrafficView Logger data output for data quality review
APPL-6	↑	<input checked="" type="checkbox"/>	Follow up With Scott M re: Document
ATMS-1	↑	<input checked="" type="checkbox"/>	Brendan coordinate w/ Mike W. to scheduling time for ATMS interface building
ATMS-2	↑	<input checked="" type="checkbox"/>	Brendan Initial Scheduling w/ Desk Staff
ATMS-6	↑	<input checked="" type="checkbox"/>	Maps API Protocols

1-5 of 79 1 2 3 4 5 6 7 8 9 ▶

Filter Results: Status: In Progress

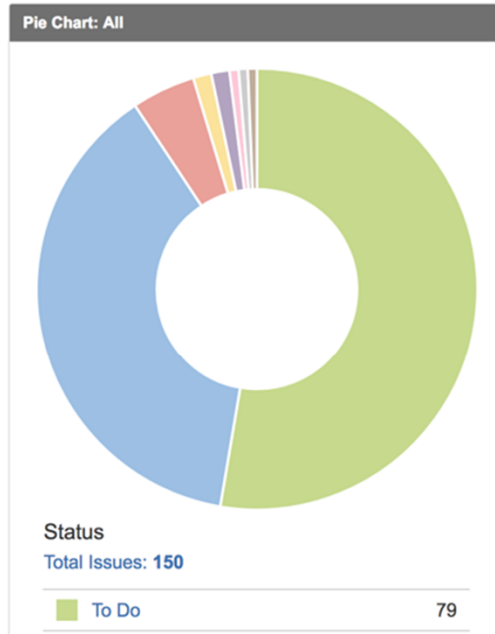
T	Key	Summary	P
<input checked="" type="checkbox"/>	VOICE-2	Port Newark/Elizabeth Voice Match	↑

1-1 of 1

Filter Results: Status: Waiting for Waze

T	Key	Summary	P
<input checked="" type="checkbox"/>	WDI-25	Travel Time Formatting Bug	↑
<input checked="" type="checkbox"/>	WDI-33	WDI-5 / Ask Waze difference between API urls	↑
<input checked="" type="checkbox"/>	WFD-3	Frontage Feature	↑
<input checked="" type="checkbox"/>	WFD-1	Waze - Flight Integration	↑
<input checked="" type="checkbox"/>	VOICE-6	George Washington Bridge Voice Match	↑

1-5 of 7 1 2 ▶



Filter Results: Status: Done

T	Key	Summary	P
<input checked="" type="checkbox"/>	VOICE-4	JFK Airport Voice Match	↑
<input checked="" type="checkbox"/>	WDI-24	WDI-16 / Address TravelTime Bug	↑
<input checked="" type="checkbox"/>	WFD-8	Traffic View Bug	↑
<input checked="" type="checkbox"/>	COM-7	Assist in adding Waze Live map to LGA Website	↑

Filter Results: Status: On Hold

T	Key	Summary	P
<input checked="" type="checkbox"/>	ANY-1	Zendrive @ LGA	↑

1-1 of 1



Waze NOR Editors

#waze_and_panynj_w_protein

0 ONLINE

TEXT CHANNELS

- # general
- # area_managers
- # bootcamp
- # mte_team
- # regional_area_crisis_closu...
- # off_topic_banter
- # waze_and_panynj_w_p...
- # delaware
- # new_jersey
- # new_york
- # ny_greater_nyc_li
- # ny_state_east
- # ny_state_west
- # ny_closures
- # nyc_closure_task_force
- # pennsylvania
- # pa_closures

VOICE CHANNELS

kaplanbren #4913

Andy (2) [CCP] Port Authority Yesterday at 10:08 AM
 -- we're on the phone now with Washington Airport people --- can you chat or PM me an eMail of yours to help make the introduction post-call.

August 30, 2017

Andy (2) [CCP] Port Authority Today at 8:15 AM
 FYI - re Bridge:
 Andy - sorry for the delay - was on vacation and missed the opening myself. I don't believe at this point we are changing any signs to reflect the new name, however I have reached out to a few folks to confirm. The new signs may not be in place until the final opening of the second span.

Today at 8:54 AM
 In that case we can do the same in Waze Andy, thanks for checking it out
 @kaplanbren (2) CCP_PortAuthority sorry missed your message yesterday. The pesopn I know who is well versed in the feed is busy in Texas with Harvey. If I had to guess it is the number of currently active wazers in the area, same as the "wazers around you" number splashed when you start the app.

kaplanbren (2) CCP_PortAuthority Today at 9:12 AM
 Of course -- let's not bother them while they're doing such important work right now... we can swing back to it later. Thank you!

Today at 2:52 PM
 @kaplanbren (2) CCP_PortAuthority I have some movement with the closure script tools will get back to you soon

Today at 3:12 PM
 @kaplanbren (2) CCP_PortAuthority check out #nyc_closure_task_force you may want to subscribe to be notified about comments on closure submitted by the AOC

Message #waze_and_panynj_w_protein

ASSISTANT REGIONAL COORDINATOR—1
 Playing with Wazeopedia

MULTI STATE MANAGER—3

LARGE AREA MANAGER—1

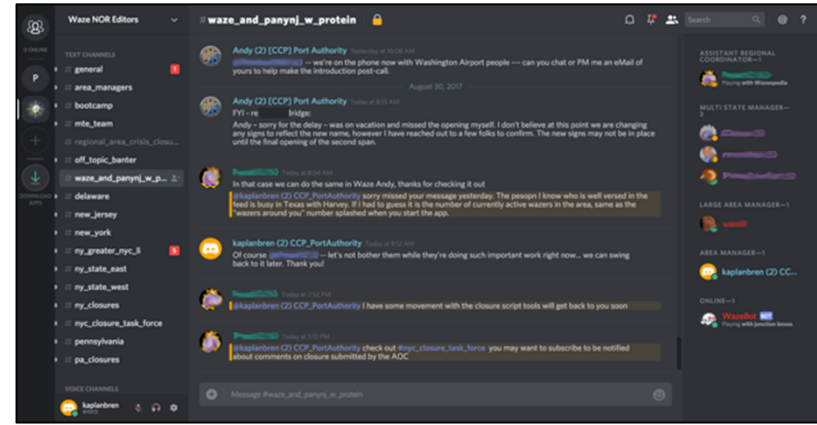
AREA MANAGER—1
 kaplanbren (2) CC...

ONLINE—1
 WazeBot BOT
 Playing with junction boxes





JIRA + Confluence = \$20/ mo
40 hours to install and configure



Discord = Free



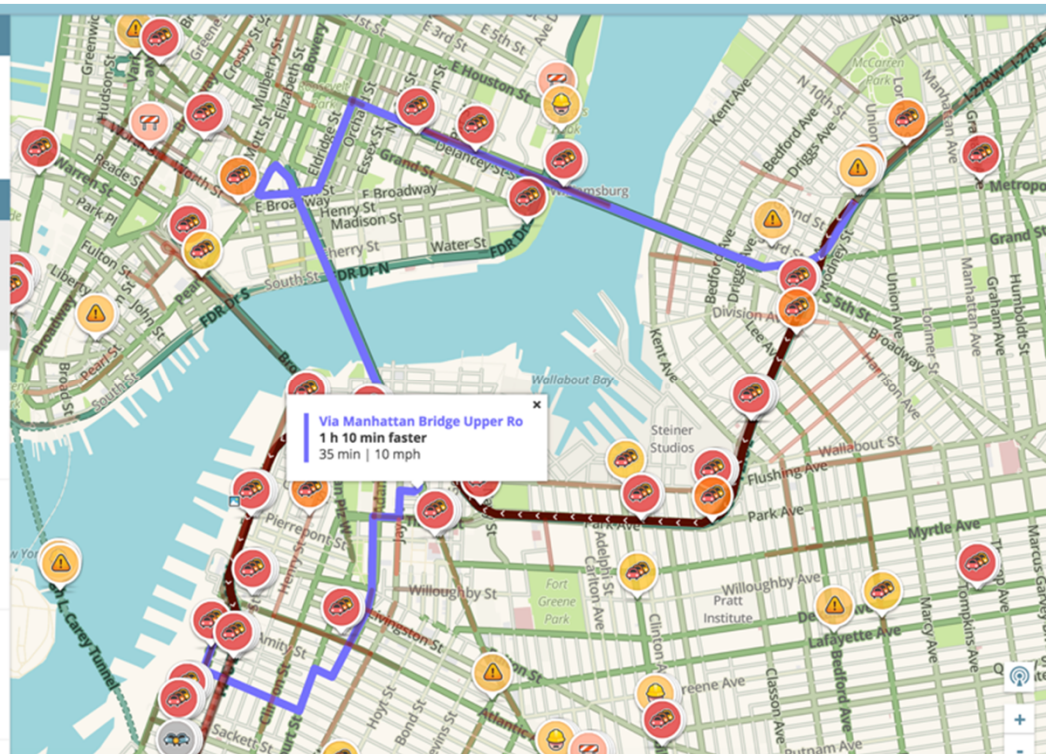
Waze: Maintain Situational Awareness





Specifics – Maintain Situational Awareness

WAZE-O-METER		
Expect moderate traffic in your area		
UNUSUAL TRAFFIC		
I-278 W, Brooklyn 3.99 miles	1 h 32 min longer than usual 1 h 44 min 2 mph 11 min 20 mph	
Columbia St, Brooklyn 0.63 miles	38 min longer than usual 41 min 1 mph 2 min 15 mph	
W 28th St, Manhattan 1.02 miles	16 min longer than usual 30 min 2 mph 14 min 4 mph	
I-278 E / Gowanus Expwy, Brooklyn 2.6 miles	18 min longer than usual 23 min 7 mph 5 min 30 mph	major accident I-278 E / Gowanus Expwy



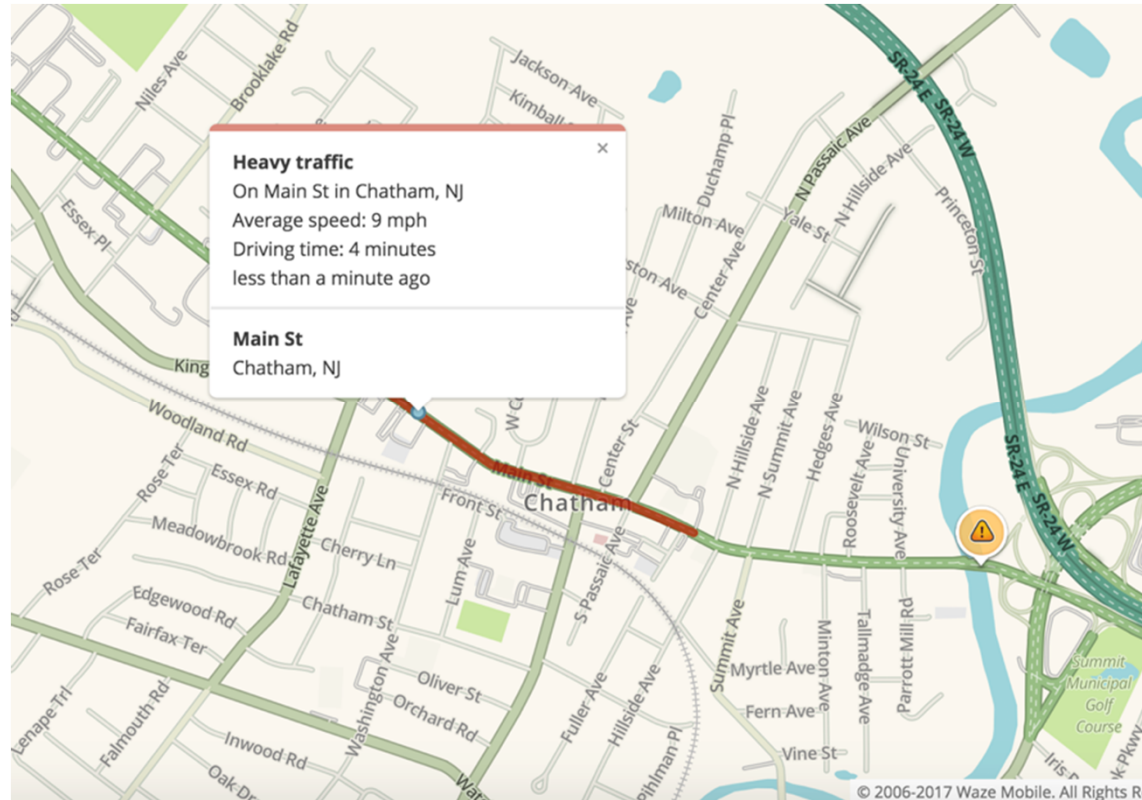


Specifics – Maintain Situational Awareness

<p>Dyer Ave 0.26 miles</p>			
<p>> I-95 N / Express Leonia; I-95 N / Upper Level Fort Lee I-95 N / Express to Exit 1 C-D (Old Exit 3); I-87 / Major Deegan Expwy / Albany / Queens 5.2 miles</p>	<p>3 min longer than usual 11 min 27 mph 8 min 38 mph</p>	<p> road construction I-95 N / Upper Level</p>	
<p>> GWB EB - Palisades Interstate Parkway from Exit 1 to the Alexander Hamilton Bridge Palisades Interstate Pkwy S to I-95 S 4.27 miles</p>	<p>3 min longer than usual 10 min 25 mph 6 min 39 mph</p>	<p> road construction I-95 N / Upper Level</p>	
<p>> GWB EB - Route 4 from Fort Lee to the Alexander Hamilton Bridge via the Upper Level SR-4 E to Exit 1 C-D (Old Exit 3); I-87 / Major Deegan Expwy / Albany / Queens</p>	<p>3 min longer than usual 10 min 21 mph 7 min 30 mph</p>	<p> road construction I-95 N / Upper Level</p>	



Specifics – Maintain Situational Awareness

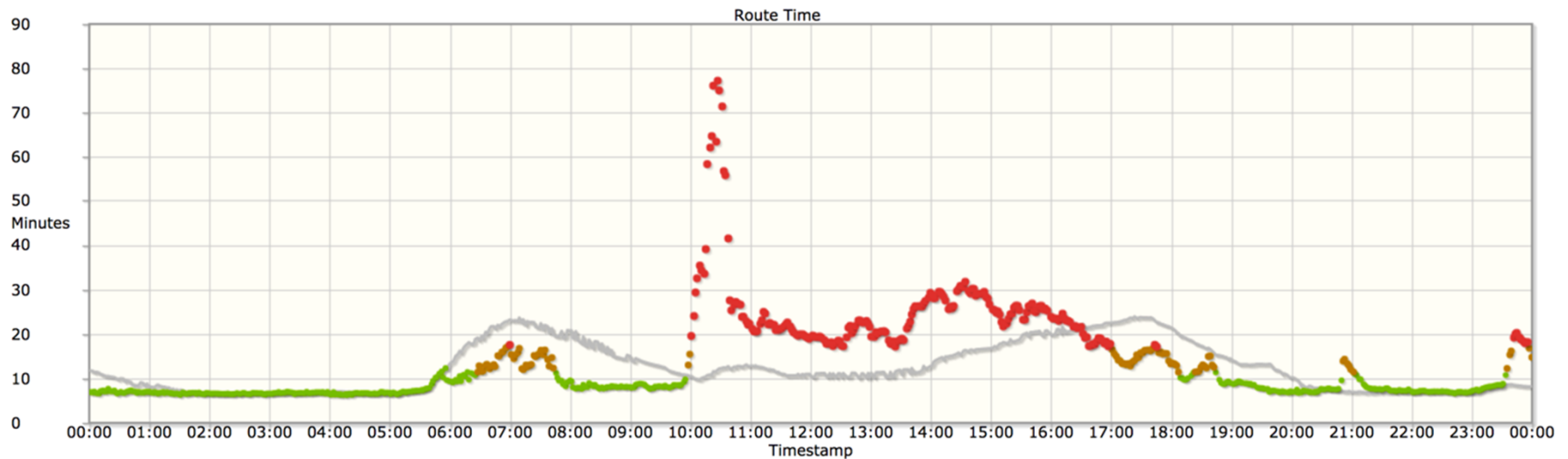




Specifics – Maintain Situational Awareness

GWB - PIP Helix Const - EB - NJ Side to NY Side (From I-80/I-95 Local to Amsterdam Ave via X-Over)

« [Route list](#) - Period: [2017-06-30](#) | [2017-07-01](#) | [2017-07-02](#) | [2017-07-03](#) | [2017-07-04](#) | [2017-07-05](#) | [2017-07-06](#) | **2017-07-07** | [2017-07-08](#) | [24 hours](#)



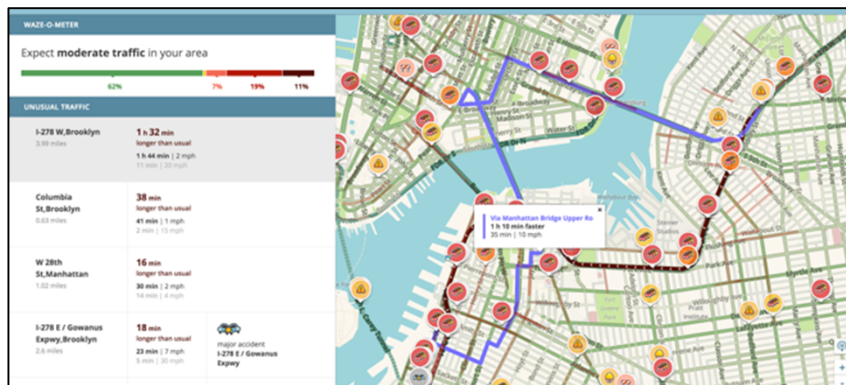


Specifics – Maintain Situational Awareness

Timestamp	Route Time	Usual Time	Delay	Jam Level
2017-07-07				
23:59:48	14:46	08:10	7 mins (80%)	
23:57:04	16:48	08:12	9 mins (104%)	
23:55:41	18:11	08:12	10 mins (121%)	
23:52:58	17:56	08:14	10 mins (117%)	
23:51:36	18:18	08:15	10 mins (121%)	
23:48:52	18:45	08:21	10 mins (124%)	
23:47:32	19:12	08:23	11 mins (129%)	
23:44:40	20:14	08:26	12 mins (139%)	
23:43:19	19:56	08:30	11 mins (134%)	
23:41:56	19:10	08:32	11 mins (124%)	



Specifics – Maintain Situational Awareness



10 hours spread over
7 days
Non-technical



10 hours spread over
2 days
JSON/ XML, JavaScript

Waze: Aid Customer Navigation



Specifics - Navigation





Specifics - Navigation: Bayonne Bridge



Before



Present



Specifics - Navigation: Bayonne Bridge





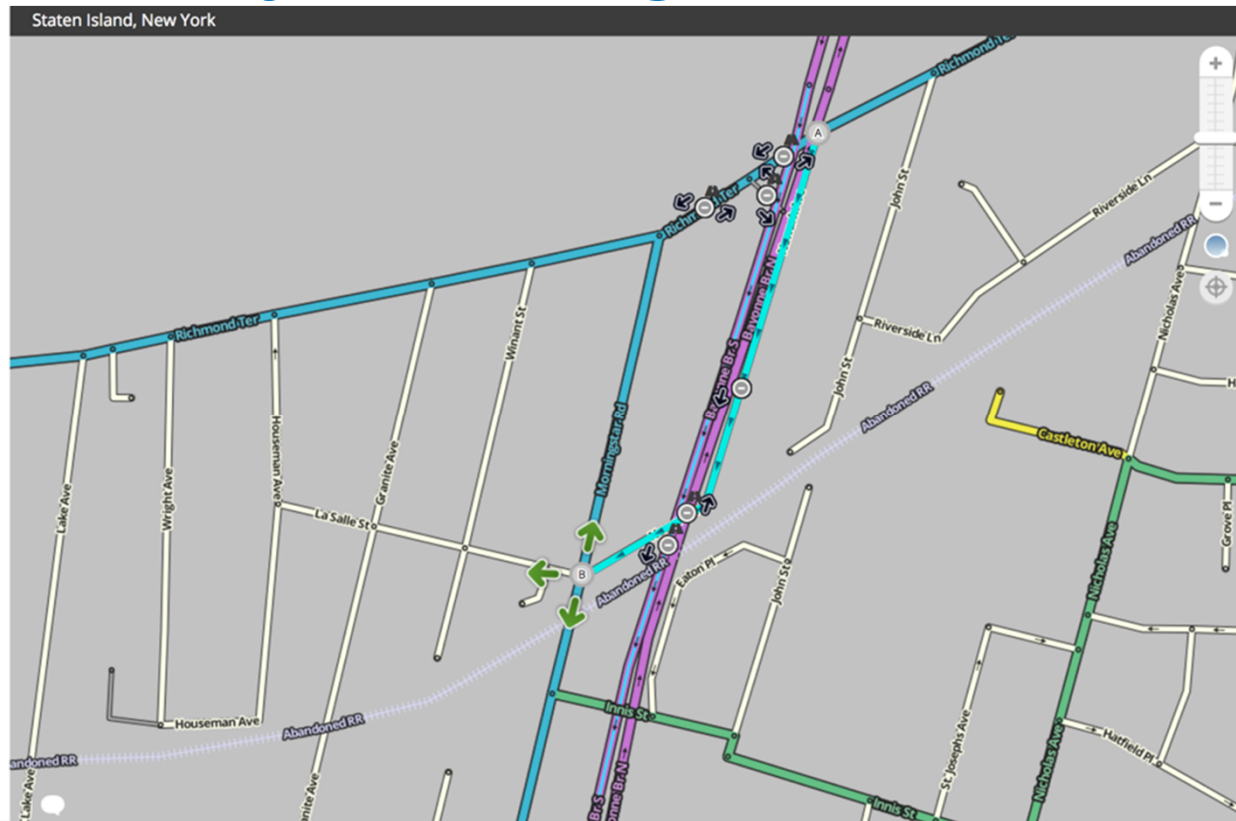
Specifics - Navigation: Bayonne Bridge



○ Add advanced closure

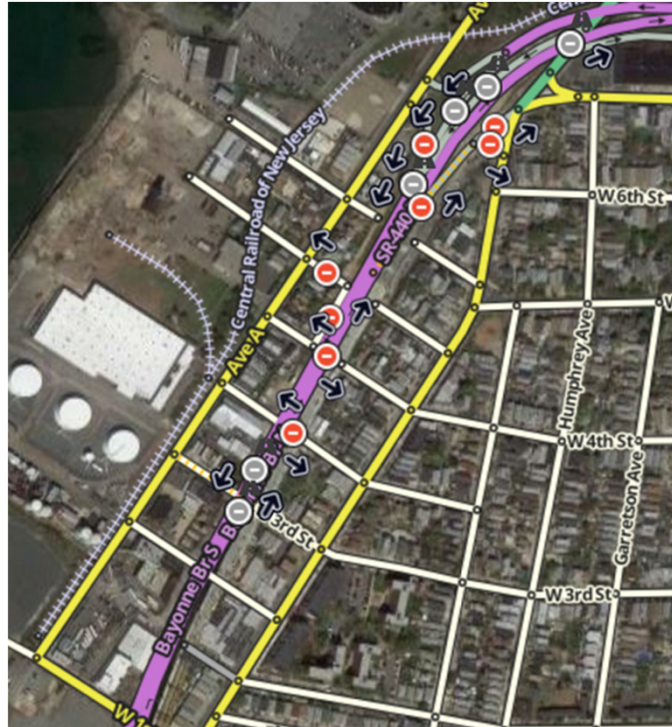
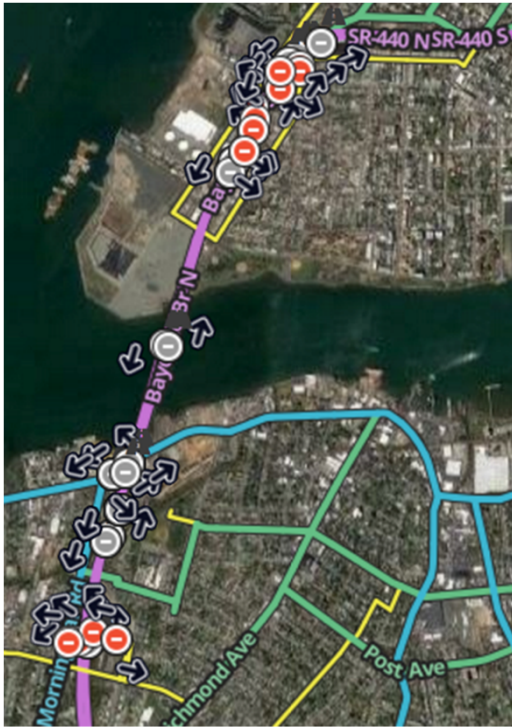
+ Add a closure

A > B	Bayonne Bridge Repair	START 2017-04-24 09:00	END 2017-04-24 15:00
A > B	Bayonne Bridge Repair	START 2017-04-25 09:00	END 2017-04-25 15:00
A > B	Bayonne Bridge Repair	START 2017-04-26 09:00	END 2017-04-26 15:00
A > B	Bayonne Bridge Repair	START 2017-04-27 09:00	END 2017-04-27 15:00



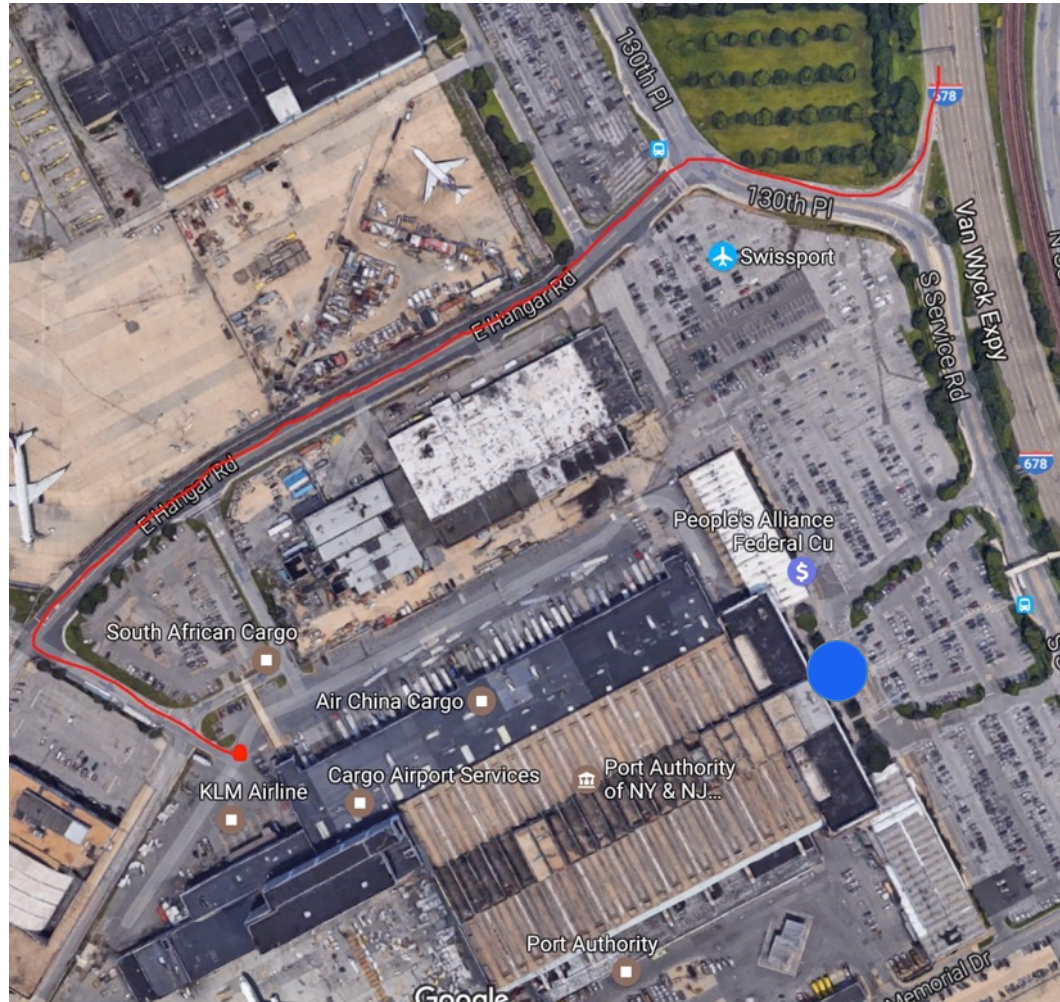


Specifics - Navigation: Bayonne Bridge



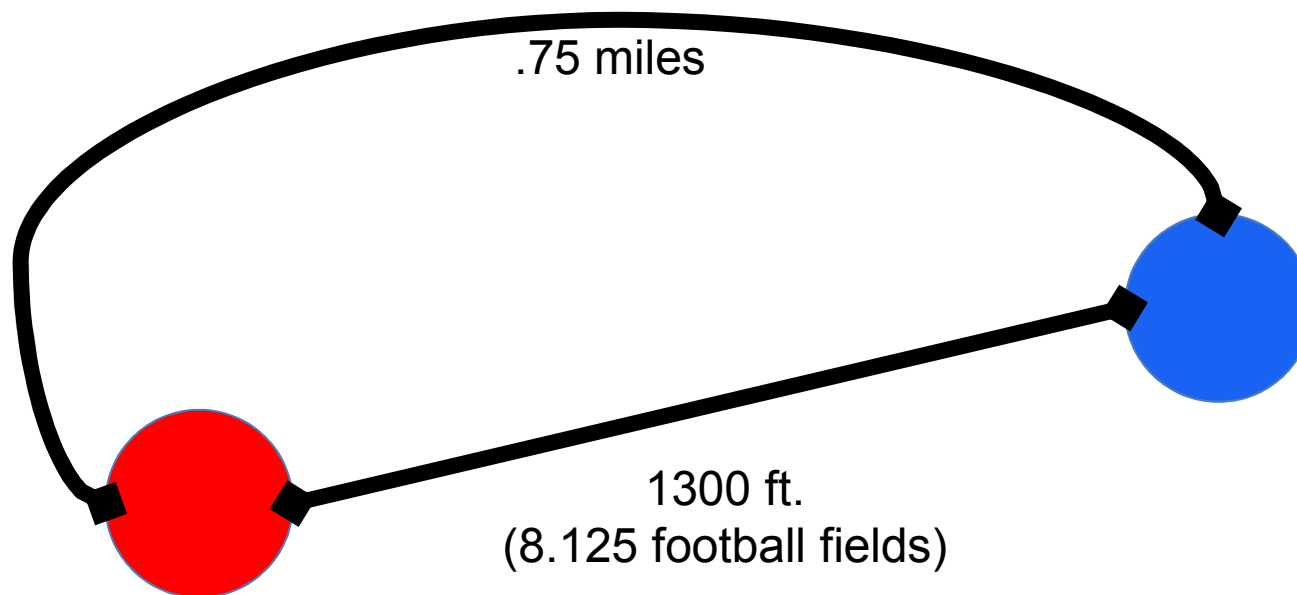
Specifics – Map Maintenance





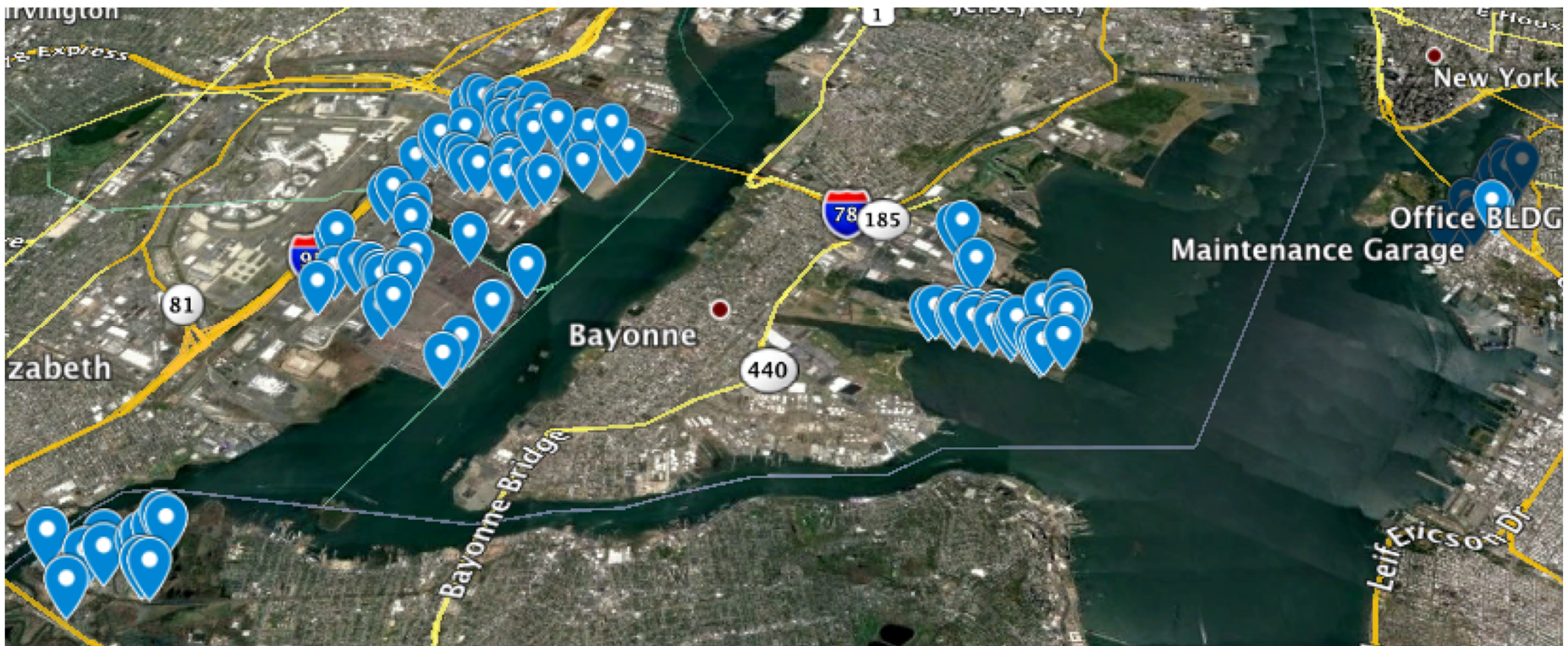


Specifics – Map Maintenance: Point Validation





Specifics – Map Maintenance: Point Validation





Specifics – Map Maintenance: Real World/ Digital Map Match



to Grand Central Pkwy W,
Queens, New York

This segment has one or more road closures.
Remove all road closures to edit it.

General Closures

○ Add advanced closure

+ Add a closure

○ • ○
LGA Redevelopment
START 2017-04-14 20:00
END 2017-04-17 10:30

○ • ○
LGA Redevelopment
START 2017-04-17 20:00
END 2017-04-20 10:30

○ • ○
LGA Redevelopment
START 2017-04-20 20:00
END 2017-04-21 10:30

○ • ○
LGA Redevelopment
START 2017-04-21 20:00
END 2017-04-24 10:30

○ • ○
LGA Redevelopment
START 2017-04-24 20:00
END 2017-04-27 10:30



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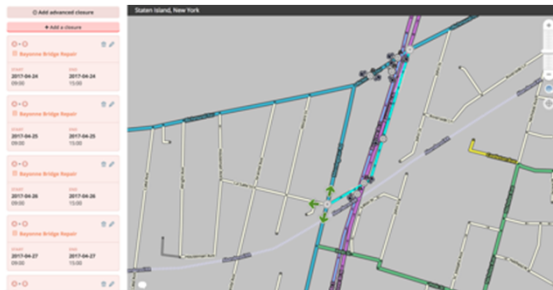


Specifics – Map Maintenance: Real World/ Digital Map Match





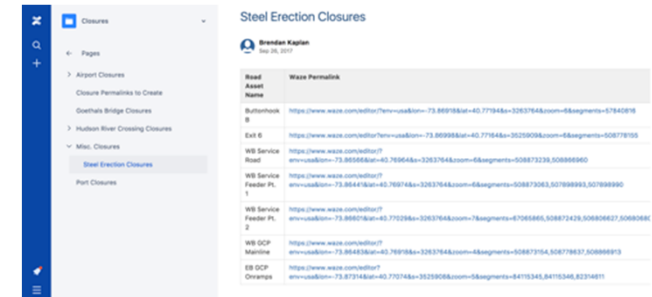
Specifics – Navigation



Training:
40 hours over
course of 30 days



Operation:
5 – 15 hours per week

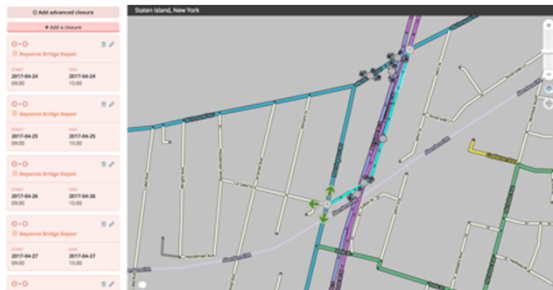


Info Maintenance:
.5 – 1.5 hours per week
+ \$20/ month for Atlassian





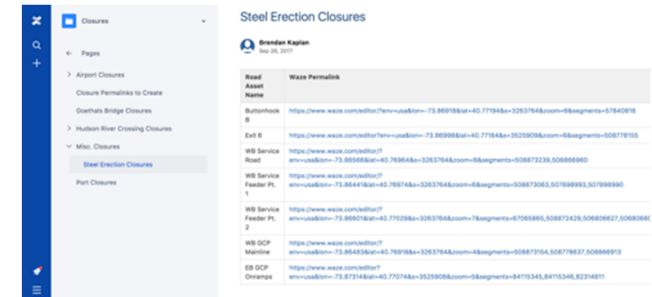
Specifics – Map Maintenance



Training:
40 hours over
course of 30 days



Operation:
1 – 10 hours per week



Info Maintenance:
.5 – 1.5 hours per week
+ \$20/ month for Atlassian

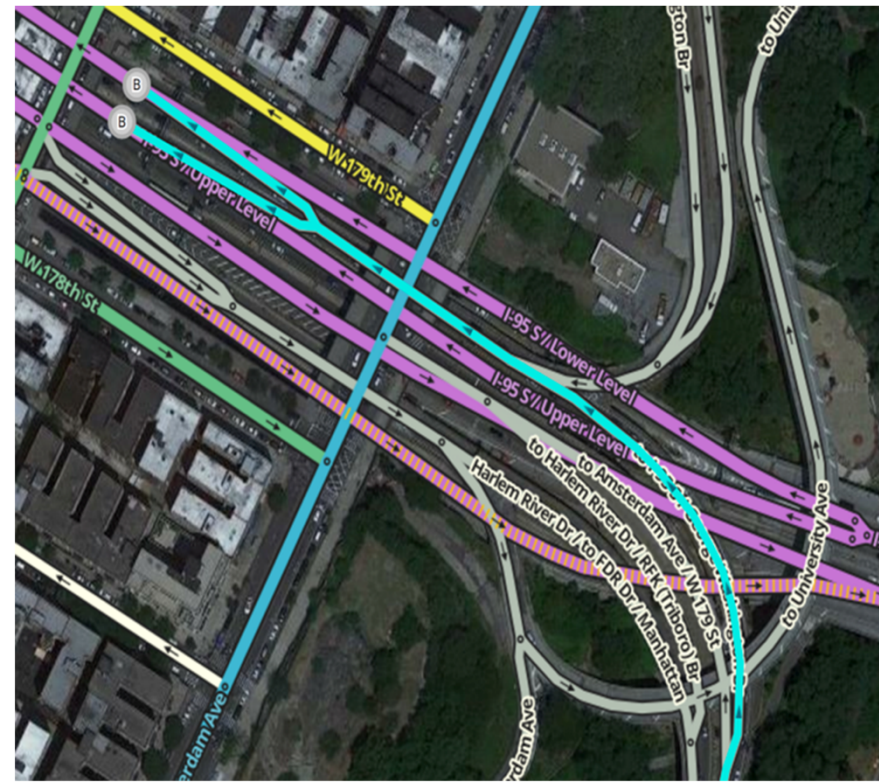


Waze: Communicate w/ Customers to Set Expectations and Improve Experience





Specifics – Navigation + Comm: Harlem River Drive → GWB



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Specifics - Navigation: Harlem River Drive → GWB





Specifics - Navigation: Harlem River Drive → GWB



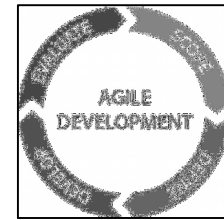
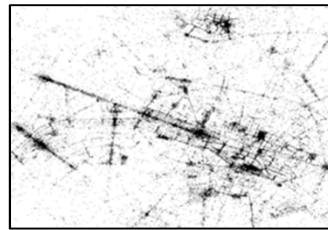


- Plot Waze issues
- Track long term travel time
- Explore travel time/ incident relationship
- Keep track of map updates

Problem:

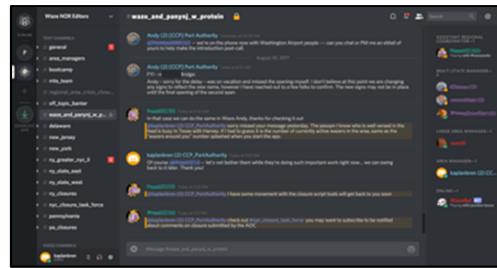


Solution:



Deliverables:





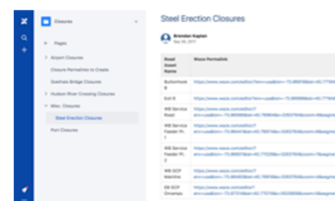
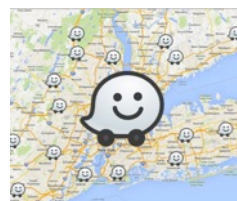
JIRA + Confluence = \$20/ mo
40 hours to install and configure

Discord = Free



10 hours spread over
7 days
Non-technical

10 hours spread over
2 days
JSON/ XML, JavaScript



Training:
80 hours over
course of 30 days

Info Maintenance:
1 – 3 hours per week
+ \$20/ month for Atlassian

Operation:
6 – 25 hours per week



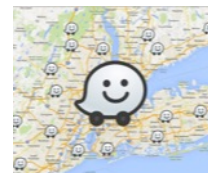
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Initial Investment:

160 hours for setup, config, training

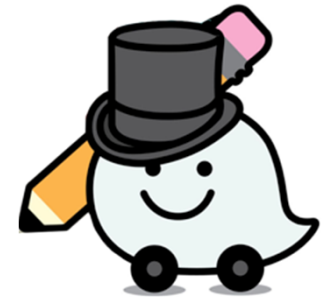
Operation:

5.5 - 16.5 hrs per week + \$20/ month



\$20,000 spent over course of 1 month delivers capabilities which are operated at a cost of roughly \$1,500 per month. Total cost of build + operate for one year = \$36,500. Round up to \$50k for buffer + extra tools if desired.

Questions?



Brendan Kaplan

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brendan.Kaplan@aeapc.com



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