# Emergency Response

## Operational Monitoring, Incident Response and Situational Awareness for First Responder Organisations

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Trapeze™
Here for the journey

# About Trapeze

Panel Title

98 - Transportation Solutions Software

Panel Title

12 - Operations Globally

Panel Title

85 - Here for the Journey

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# Emergency Services – Incident Response

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Grafana LOS ANGELES CON

# Emergency Services – Incident Response

# Emergency Services – Incident Response

TACT | RESPOND | AT SCENE | TRANSPORT | JOURNEY TRANSITION

## THE CONNECTED JOURNEY

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# Emergency Services – Incident Response

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# The Data Environment

# Key Components

Postgres / PostGIS

MS SQL Server

Custom Messaging Protocols

Custom Message Queue

1000+ vehicles

60+ message and telemetry channels

24/7/365 uptime

120M + Messages / day

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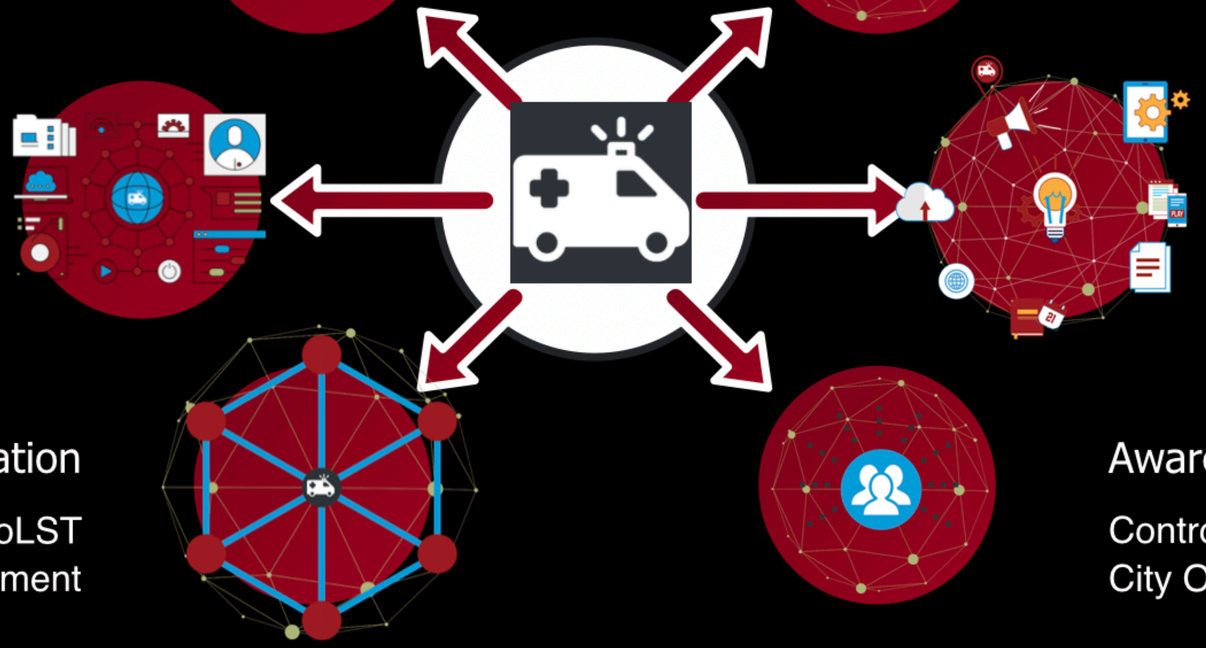
## Location

Vehicles, equipment and people locations in real-time

## Safety

Personal duress alarms, Video Cameras, Drug Safes



## Connectivity

Monitor and manage networks and data channels to vehicles and people.

## Communication

Voice, Data, Video, Text Hospitals

## Integration

Vehicle telematics, IOT / IoLST sensors, Specialist Equipment

## Awareness

Control Room (911) integration, Smart City Optimisation,

# Location

Vehicles, equipment and people locations in real-time

Connectivity

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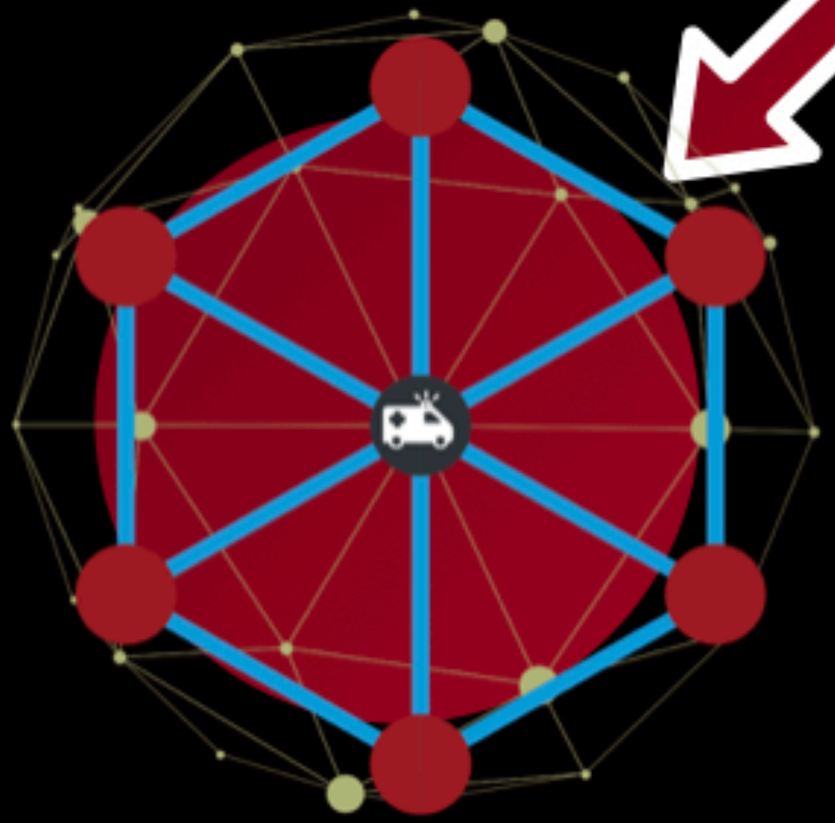

## Integration

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sensors, Specialist Equipment

Hospitals

## Awareness

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Voice, Data, Video, Text
Hospitals

## Awareness

## Safety

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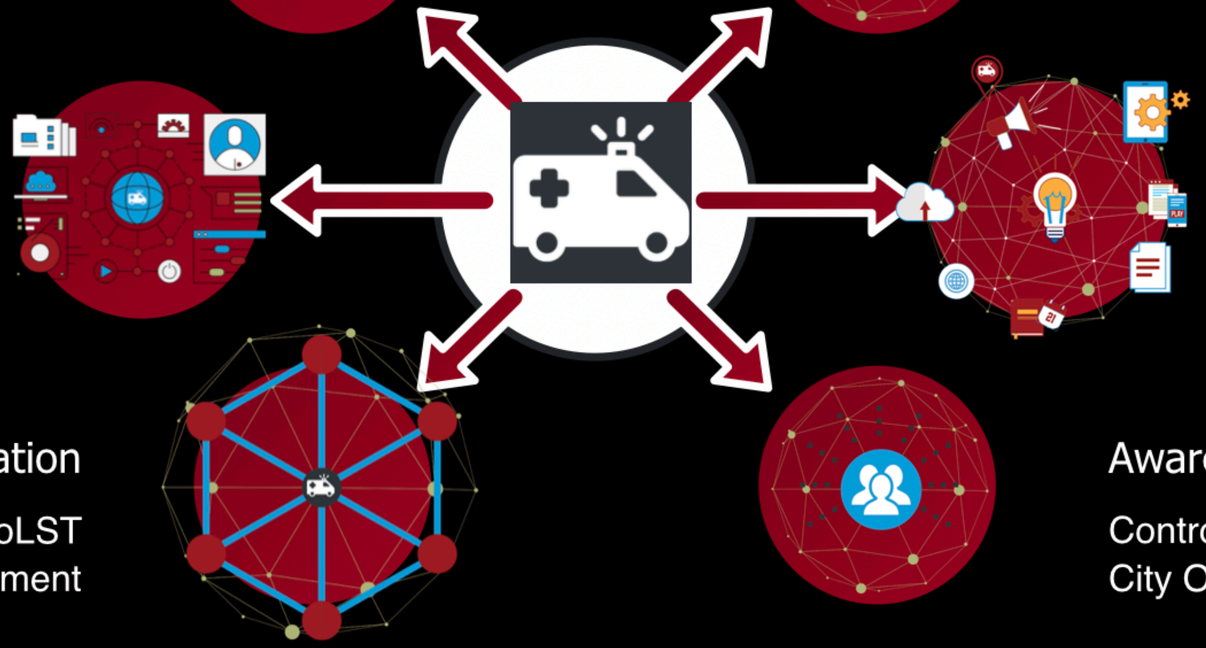

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Control Room (911) integration, Smart City Optimisation,

# Our Key Learnings

# Our Journey

Beskpoke
Development

Node
Angular
React
ASP.NET
Web Bootstraps

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# Our Journey

| Beskpoke Development | BI Tools / “COTS” Solutions |
| --- | --- |
| Node<br>Angular<br>React<br>ASP.NET<br>Web Bootstraps | Power BI<br>Tableau<br>PRTG Monitoring<br>Boutique COTS Solutions<br>Cognos<br>Excel / Access |

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# Our Journey

Beskpoke Development

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Excel / Access

Delivery in Minutes, not Weeks

Real-Time (or Near..) is fundamental

Remove dependency on developers

Prototype, Prototype, Prototype

Multiple Data Sources are Not an Issue -

User experience drives reporting

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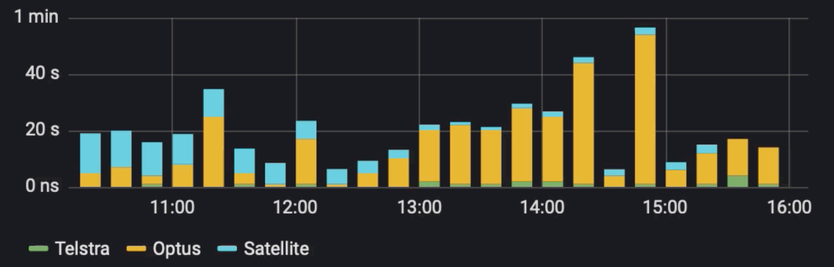
# Must be an everyday tool!

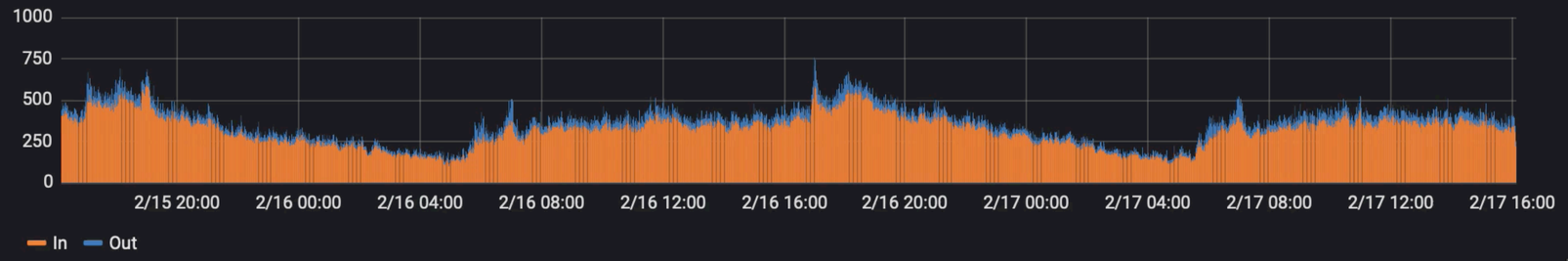
# Examples

## Average Transmission Time (Outgoing) - 15 Min Intervals




## Messages by Direction - 1 Min Intervals

Last 48 hours

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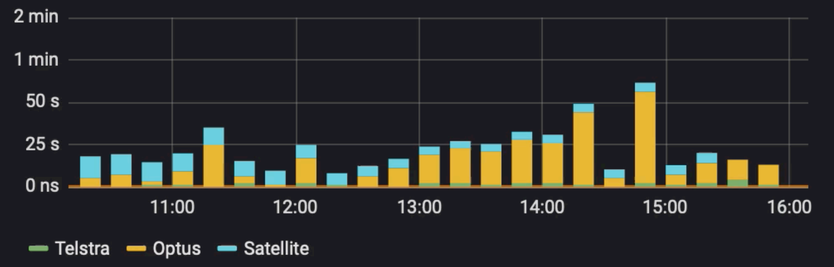
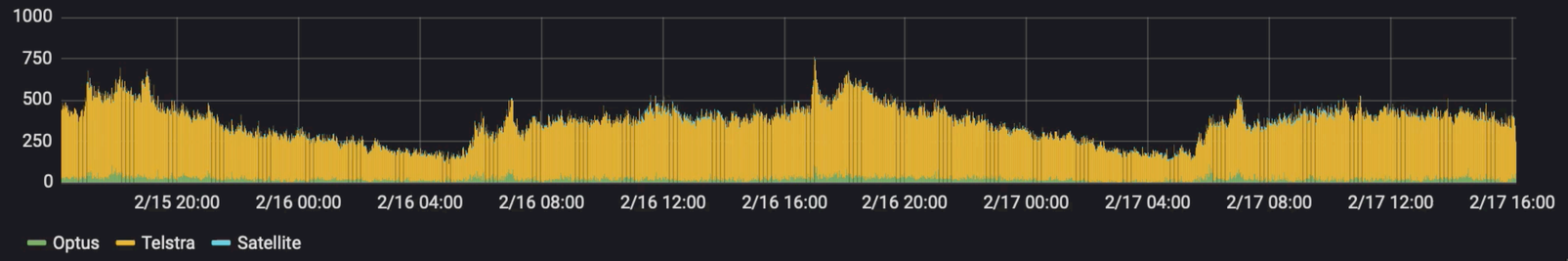



## Messages by Network - 1 Min Intervals

Last 48 hours

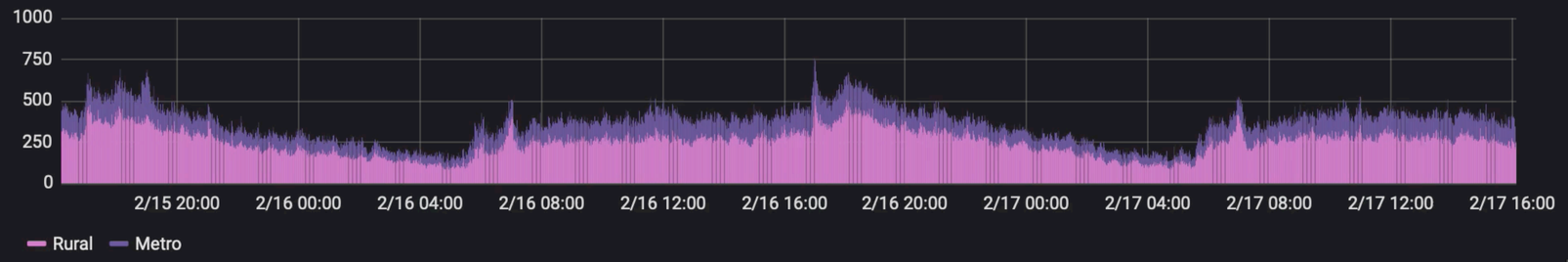



## Most Recent Message Summary

| datetimehour1min | host | direction | networkname | No Messages | No Vehicles |
|---|---|---|---|---|---|
| 2019-02-10T06:11:00Z | Metro | In | Optus | 1 | 1 |
| 2019-02-10T06:11:00Z | Metro | In | Telstra | 90 | 68 |
| 2019-02-10T06:11:00Z | Metro | Out | Telstra | 4 | 2 |
| 2019-02-10T06:11:00Z | Rural | In | Optus | 6 | 4 |
| 2019-02-10T06:11:00Z | Rural | In | Telstra | 227 | 120 |
| 2019-02-10T06:11:00Z | Rural | Out | Telstra | 10 | 5 |

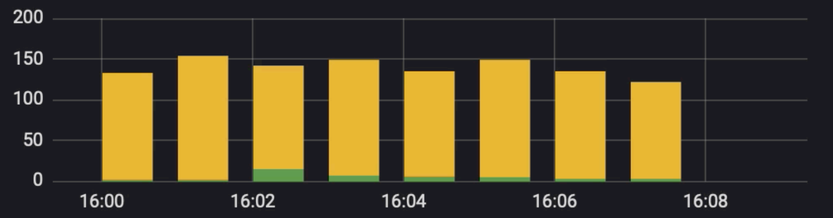
## Messages by Host - 1 Min Intervals

Last 48 hours



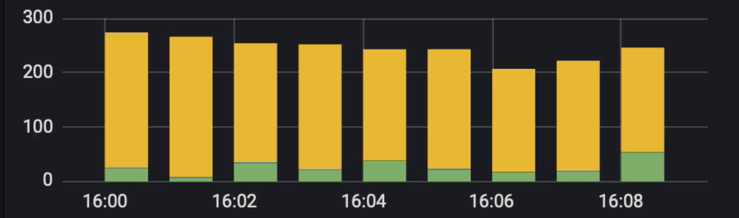

## Metro Network Utilisation - 1 Min Intervals

Last 10 minutes




| | min | max |
|---|---|---|
| Optus | 2 | 15 |
| Telstra | 119 | 152 |

## Rural Network Utilisation - 1 Min Intervals



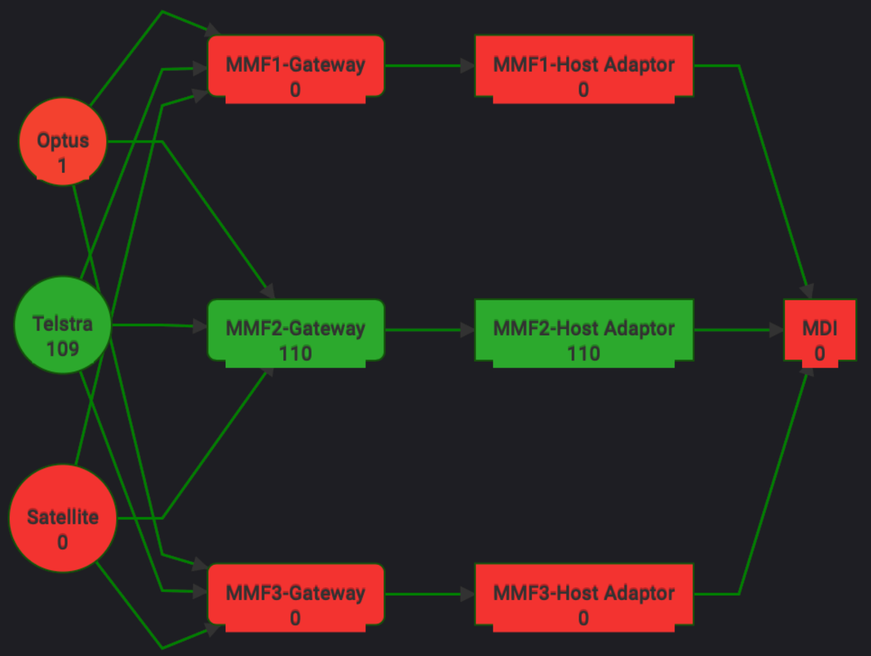

| | min | max |
|---|---|---|
| Optus | 7 | 53 |
| Satellite | 1 | 1 |

## Rural System State

0 100

| | min | max | avg | total | current |
|---|---|---|---|---|---|
| Optus | 0 | 44 | 22 | 44 | 0 |
| Telstra | 0 | 265 | 132.5 | 265 | 0 |
| MDI | 0 | 0 | 0 | 0 | 0 |
| MMF1_Gateway | 0 | 0 | 0 | 0 | 0 |
| MMF1_Host | 0 | 0 | 0 | 0 | 0 |
| MMF2_Gateway | 309 | 309 | 309 | 309 | 309 |
| MMF2_Host | 309 | 309 | 309 | 309 | 309 |
| MMF3_Gateway | 0 | 0 | 0 | 0 | 0 |
| MMF3_Host | 0 | 0 | 0 | 0 | 0 |
| Satellite | 0 | 0 | 0 | 0 | 0 |

## Metro System State



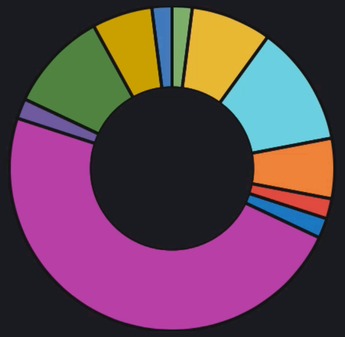

0 100

| | min | max | avg | total | current |
|---|---|---|---|---|---|
| Optus | 0 | 1 | 0.5 | 1 | 0 |
| Telstra | 0 | 109 | 54.5 | 109 | 0 |
| MDI | 0 | 0 | 0 | 0 | 0 |
| MMF1_Gateway | 0 | 0 | 0 | 0 | 0 |
| MMF1_Host | 0 | 0 | 0 | 0 | 0 |
| MMF2_Gateway | 110 | 110 | 110 | 110 | 110 |
| MMF2_Host | 110 | 110 | 110 | 110 | 110 |
| MMF3_Gateway | 0 | 0 | 0 | 0 | 0 |
| MMF3_Host | 0 | 0 | 0 | 0 | 0 |
| Satellite | 0 | 0 | 0 | 0 | 0 |

Zone: Sydney Zone | STATUS: All | VEHICLE: All

## Total Vehicles

50

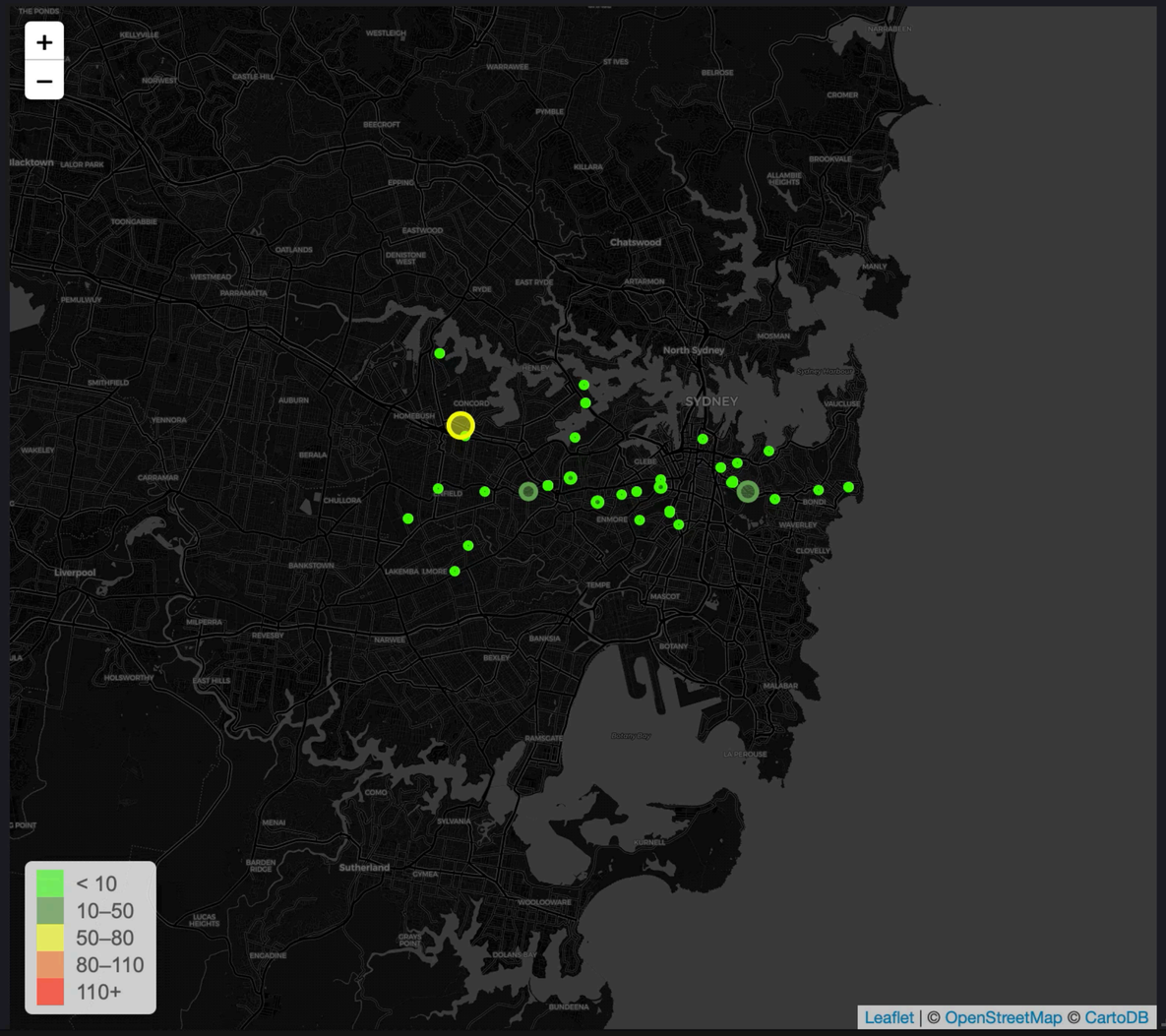


| | total | percentage |
|---|---|---|
| alerted | 1 | 2% |
| AT DEST | 4 | 8% |
| AT SCENE | 6 | 12% |
| AT STN | 3 | 6% |
| AVAIL | 1 | 2% |
| IN VEHICLE | 1 | 2% |
| OFF DUTY | 24 | 48% |
| OFF STREET | 1 | 2% |
| RESPOND | 5 | 10% |
| TO STN | 3 | 6% |
| TRANSPORT | 1 | 2% |

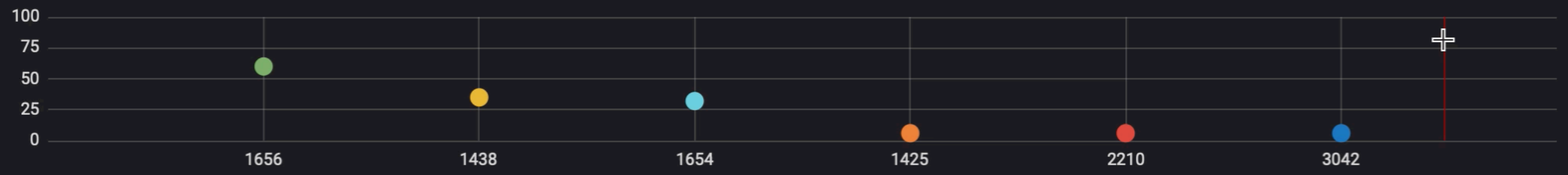
## CURRENT RESPONSE (MINUTES)

12.14

## Map...




## SPEED




## STATUS

| VEHICLE | JOB | STATUS | PRIORITY |
|---|---|---|---|
| 1659 | 11165 | AT DEST | 1B |
| 1661 | 11206 | AT SCENE | 1C |
| 1984 | 11164 | AT DEST | 1C |
| 1951 | 11122 | AT DEST | 1C |
| 3421 | 11110 | AT SCENE | 1C |
| 1443 | 11151 | AT SCENE | 1C |
| 1619 | 11229 | RESPOND | 2A |
| 1436 | 11209 | RESPOND | 2A |
| 1438 | 11224 | RESPOND | 2AE |
| 1660 | 11140 | AT DEST | 2AE |
| 1417 | 11194 | AT SCENE | 2B |
| 1654 | 11230 | RESPOND | 2B |
| 1805 | 11227 | RESPOND | 2BH |
| 1420 | 11191 | TRANSPORT | 2_I |
| 1422 | 11089 | OFF STREET | 2_I |
| 1430 | 11208 | AT SCENE | 2_I |
| 1445 | 11116 | alerted | 2_I |
| 1649 | 11130 | AT SCENE | 2_I |
| 1441 | - | AT STN | |
| 1656 | - | TO STN | |
| 3099 | - | IN VEHICLE | |
| 1432 | - | TO STN | |

| PRIORITY | VEHICLES |
|---|---|
| 1B | 1 |
| 1C | 5 |
| 2A | 2 |
| 2AE | 2 |
| 2B | 2 |
| 2BH | 1 |

## SIRENS

16:25

## EMERGENCY LIGHTS

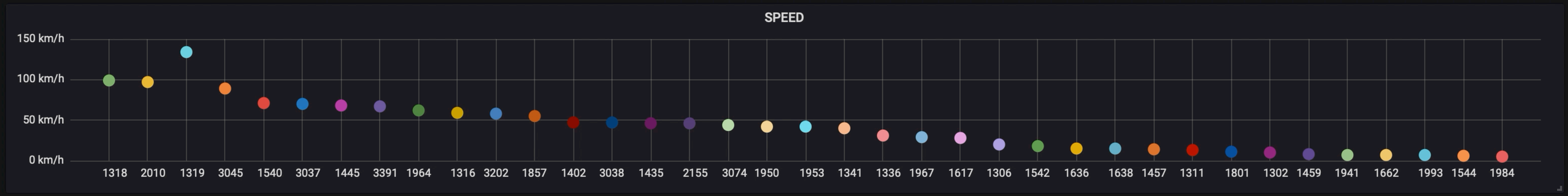
16:25

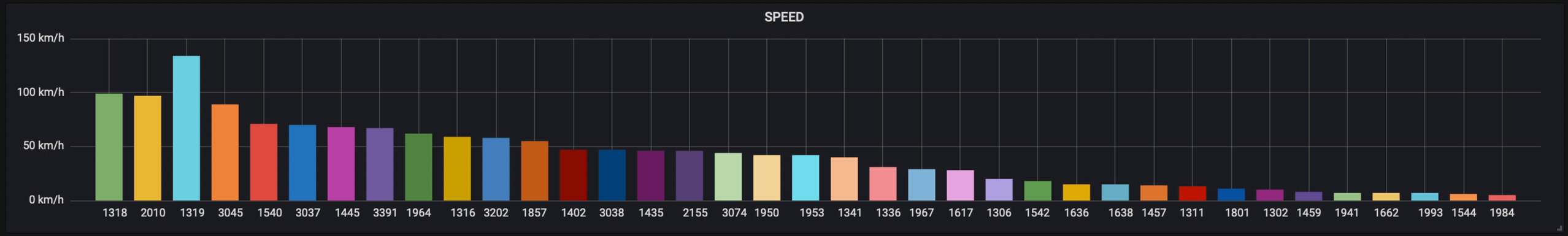
Current Max Speed

99 km/h

Current Max Speed

62 mph



Vehicle 3099

IGNITION
ON

PARK BRAKE

LIGHTS

SIRENS

ENGINE

GEAR

DOOR
CLOSED

HEADING

OUTSIDE
°C

SMART TE...
39°C

COOLANT
°C

VOLTAGE
14

SPEED SAT
66Kph

ENGINE HRS

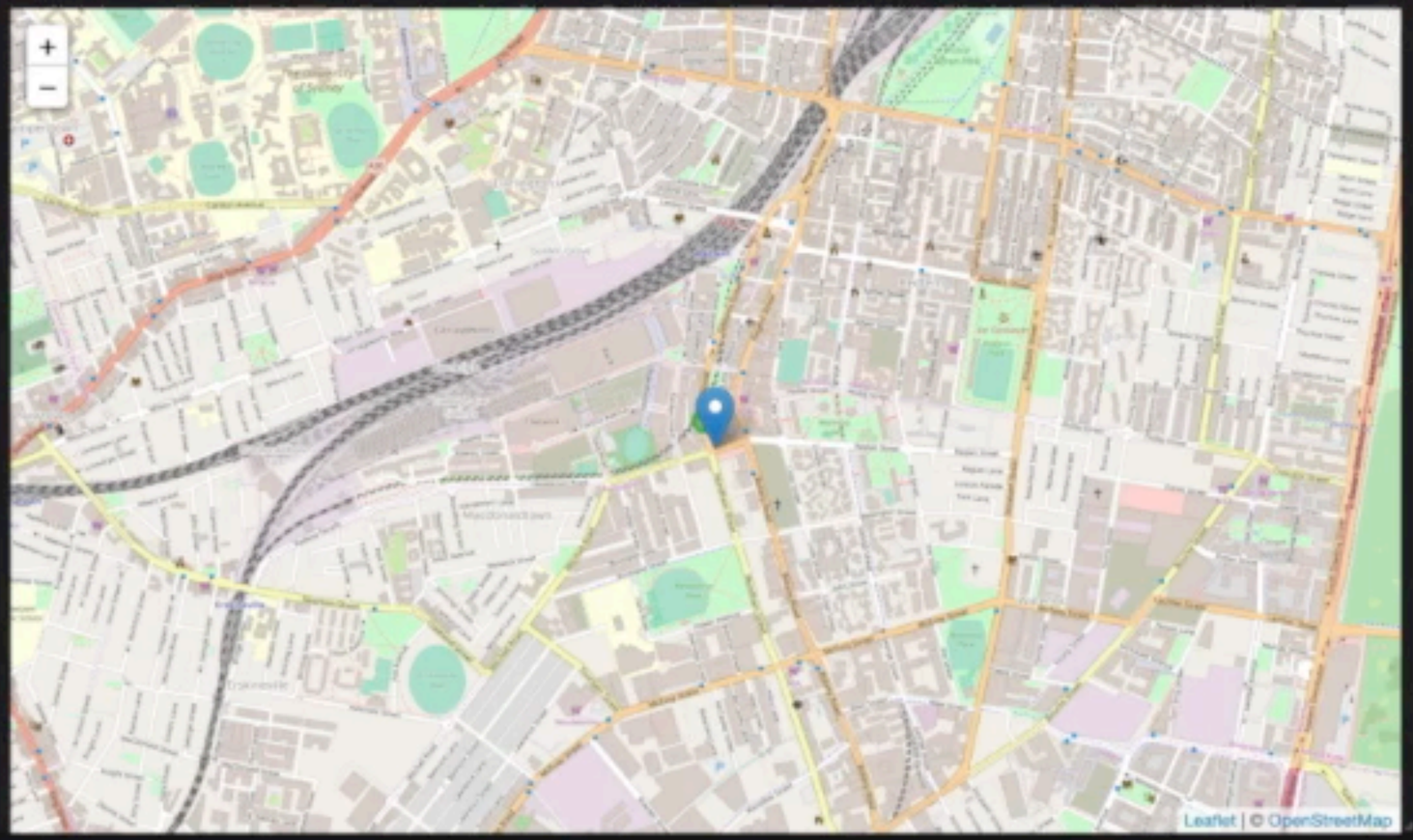
FUEL

ODO

Navigation...

METRO - GCON > VEHICLE ROUTE > VEHICLE ROUTE > VEHICLE ROUTE > VEHICLE TELEMETRY - GCON

3099




SATELLITES
7

DURESS

CRASH

| VEHICLE | REGO | ASSET | MAKE AND MODEL | BASE |
|---|---|---|---|---|
| 3099 | BZ64NA | A10895 | HYUNDAI SANTA FE | HURSTVILLE |

| JOB | PRIORITY | LAST STATUS | TIME IN STA... | 3099 |
|---|---|---|---|---|
| 10874 | 2i | 19:46:5 | 0 | RESPONDING |

1436

SIRENS

SPEED

TEMP (OUT)

VOLTAGE

LAST STATUS

16:45:07

MINUTES IN STATUS

PRIORITY

2A

STATUS

TRANSPORT

LIGHTS

7

N/A

14

JOB

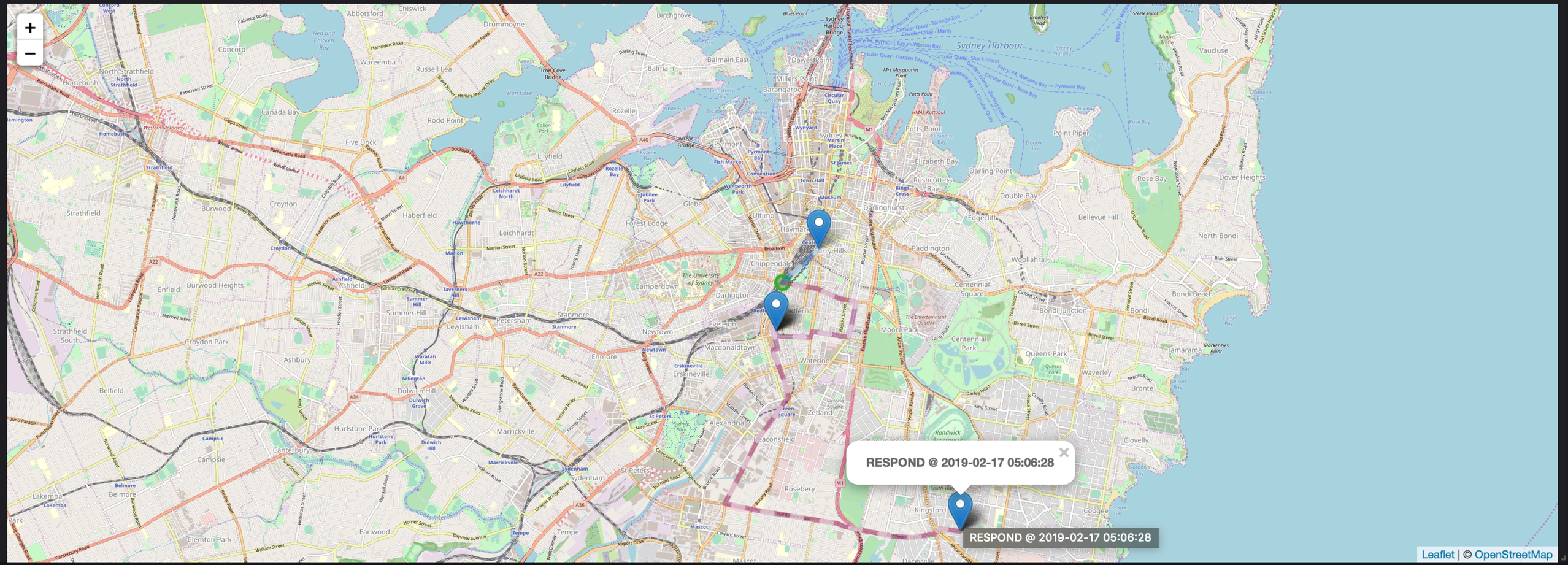
11209

15

HEADING

←

Map View




Navigation...

VEHICLE ROUTE

STREETVIEW

VEHICLE DETAILS

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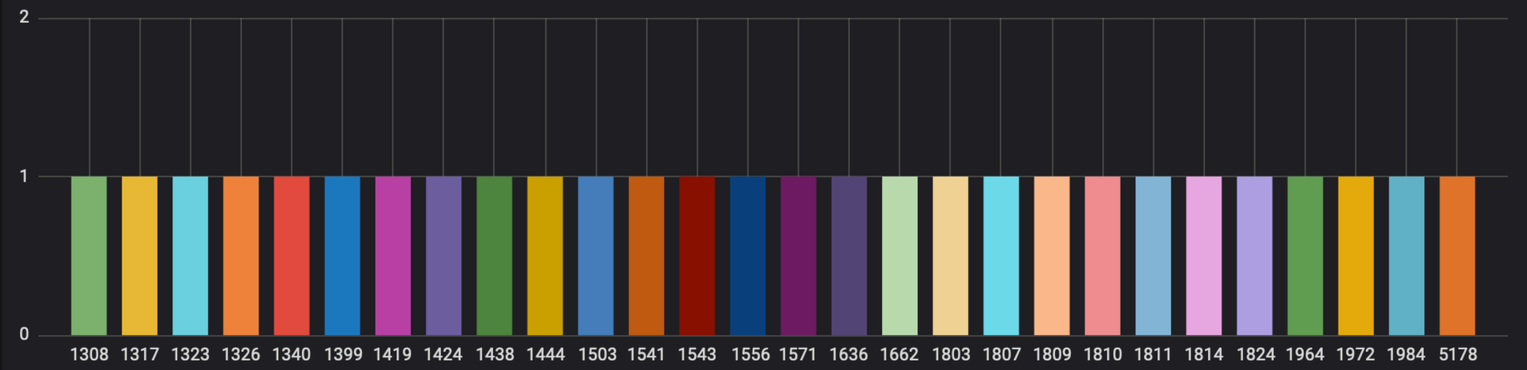
## Panel Title

Last 7 days

| | total | percentage |
|---|---|---|
| CAN_Lamp_Washer_Fluid_Low | 10 | 36% |
| CAN_Lamp_License_Plate | 8 | 29% |
| CAN_Lamp_SRS_On | 4 | 14% |
| CAN_Lamp_Break_Wear | 2 | 7% |
| CAN_Lamp_Right_Low_Beam | 2 | 7% |
| CAN_Lamp_Right_Front_Parking_Defective | 1 | 4% |
| CAN_Lamp_Left_Tail_Defective | 1 | 4% |

## Faults by Vehicle

Last 7 days




## Panel Title

Last 7 days

| VehicleId | EventTimestamp | ChannelName | ChannelValue | ChannelDescription | Criticality |
|---|---|---|---|---|---|
| 1340 | 15/02/19 10:06:30 am | CAN_Lamp_SRS_On | 1.00 | CAN - SRS Light Active | 1 |
| 1424 | 16/02/19 5:17:45 pm | CAN_Lamp_Break_Wear | 1.00 | CAN - Break Wear Light Active | 1 |
| 1438 | 17/02/19 8:00:58 am | CAN_Lamp_Break_Wear | 1.00 | CAN - Break Wear Light Active | 1 |
| 1541 | 17/02/19 5:54:44 am | CAN_Lamp_SRS_On | 1.00 | CAN - SRS Light Active | 1 |
| 1807 | 15/02/19 5:33:48 am | CAN_Lamp_SRS_On | 1.00 | CAN - SRS Light Active | 1 |
| 1964 | 15/02/19 9:48:17 am | CAN_Lamp_SRS_On | 1.00 | CAN - SRS Light Active | 1 |
| 1308 | 17/02/19 5:44:24 am | CAN_Lamp_License_Plate | 1.00 | CAN - License Plate | 2 |
| 1317 | 14/02/19 6:20:16 pm | CAN_Lamp_License_Plate | 1.00 | CAN - License Plate | 2 |
| 1326 | 13/02/19 8:52:50 pm | CAN_Lamp_Right_Low_Beam | 1.00 | CAN - Right Low Beam | 2 |
| 1444 | 16/02/19 11:29:07 am | CAN_Lamp_Left_Tail_Defective | 1.00 | CAN - Left Tail | 2 |
| 1543 | 16/02/19 12:39:36 am | CAN_Lamp_License_Plate | 1.00 | CAN - License Plate | 2 |
| 1636 | 17/02/19 3:41:43 pm | CAN_Lamp_License_Plate | 1.00 | CAN - License Plate | 2 |
| 1662 | 13/02/19 5:32:18 pm | CAN_Lamp_Right_Low_Beam | 1.00 | CAN - Right Low Beam | 2 |
| 1803 | 17/02/19 6:36:17 am | CAN_Lamp_License_Plate | 1.00 | CAN - License Plate | 2 |
| 1810 | 17/02/19 12:08:44 am | CAN_Lamp_License_Plate | 1.00 | CAN - License Plate | 2 |
| 1811 | 17/02/19 5:02:33 pm | CAN_Lamp_License_Plate | 1.00 | CAN - License Plate | 2 |
| 1814 | 17/02/19 8:22:25 am | CAN_Lamp_License_Plate | 1.00 | CAN - License Plate | 2 |

## Panel Title

Last 7 days

| VehicleId | Odometer | Service Distance | time |
|---|---|---|---|
| 1308 | 116252 | 24800 | 17/02/19 5:44:24 am |
| 1317 | 152037 | 10700 | 14/02/19 6:20:16 pm |
| 1323 | 57400 | 23800 | 16/02/19 6:07:59 am |
| 1326 | 45013 | 24200 | 13/02/19 8:52:50 pm |
| 1340 | 28322 | 22000 | 15/02/19 10:06:30 am |
| 1399 | 37889 | 25300 | 16/02/19 5:52:57 pm |
| 1419 | 3000 | 27700 | 17/02/19 6:10:31 am |
| 1424 | 18588 | 12100 | 16/02/19 5:17:45 pm |
| 1438 | 57488 | 11500 | 17/02/19 8:00:58 am |
| 1444 | 46664 | 100 | 16/02/19 11:29:07 am |
| 1503 | 113290 | 11300 | 17/02/19 5:15:24 pm |
| 1541 | 51280 | 400 | 17/02/19 5:54:44 am |
| 1543 | 72085 | 12000 | 16/02/19 12:39:36 am |
| 1556 | 84150 | 29100 | 11/02/19 6:49:12 am |
| 1571 | 110622 | 3000 | 17/02/19 4:44:39 pm |
| 1636 | 140260 | 2000 | 17/02/19 3:41:43 pm |
| 1662 | 140138 | 22600 | 13/02/19 5:32:18 pm |

## Brake Faults

**6**

**Vehicles**

### Brake Faults (Last 7 Days)

| Vehicle ID | Fault | No. Faults Reported | First Fault | Last Fault | Latest Odometer | Service Dist |
|---|---|---|---|---|---|---|
| 1335 | CAN_Lamp_Break_Wear | 59 | 2019-02-17 00:00:00 | 2019-02-19 00:00:00 | 125484 | 26600 |
| 1852 | CAN_Lamp_Break_Wear | 45 | 2019-02-15 00:00:00 | 2019-02-17 00:00:00 | 143505 | 29700 |
| 1424 | CAN_Lamp_Break_Wear | 13 | 2019-02-15 00:00:00 | 2019-02-19 00:00:00 | 18922 | 11700 |
| 1438 | CAN_Lamp_Break_Wear | 10 | 2019-02-16 00:00:00 | 2019-02-19 00:00:00 | 57720 | 10700 |
| 1350 | CAN_Lamp_Break_Wear | 3 | 2019-02-17 00:00:00 | 2019-02-17 00:00:00 | 92018 | 600 |
| 1437 | CAN_Lamp_Break_Wear | 2 | 2019-02-15 00:00:00 | 2019-02-17 00:00:00 | 106573 | 13900 |

## ENR Faults (Suspension Pressure)

**0**

**Vehicles**

## Coolant Faults

**18**

**Vehicles**

### Coolant Level Faults

| Vehicle ID | Fault | No. Faults Reported | First Fault | Last Fault | Latest Odometer | Service Dist |
|---|---|---|---|---|---|---|
| 1984 | CAN_Lamp_Coolant_Level_Low | 9037 | 2019-02-15 00:00:00 | 2019-02-19 00:00:00 | 46331 | 0 |
| 1445 | CAN_Lamp_Coolant_Level_Low | 2765 | 2019-02-16 00:00:00 | 2019-02-19 00:00:00 | 45924 | 0 |
| 1315 | CAN_Lamp_Coolant_Level_Low | 875 | 2019-02-15 00:00:00 | 2019-02-19 00:00:00 | 47410 | 22700 |
| 1810 | CAN_Lamp_Coolant_Level_Low | 29 | 2019-02-17 00:00:00 | 2019-02-19 00:00:00 | 133569 | 12300 |
| 1457 | CAN_Lamp_Coolant_Level_Low | 20 | 2019-02-15 00:00:00 | 2019-02-19 00:00:00 | 38979 | 11900 |
| 1655 | CAN_Lamp_Coolant_Level_Low | 5 | 2019-02-15 00:00:00 | 2019-02-17 00:00:00 | 67541 | 10200 |

## Washer Fluid

**72**

**Vehicles**

## General Lamp Faults

**74**

**Vehicles**

### Lamp Faults Last 7 Days

| Vehicle ID | Fault | No. Faults Reported | First Fault | Last Fault | Latest Odometer | Service Dist |
|---|---|---|---|---|---|---|
| 1809 | CAN_Lamp_Left_Stop_Defective | 1433 | 2019-02-15T00:00:00Z | 2019-02-19T00:00:00Z | 128587 | 8100 |
| 1802 | CAN_Lamp_Left_Turn_Defective | 381 | 2019-02-15T00:00:00Z | 2019-02-18T00:00:00Z | 125387 | 16200 |
| 1984 | CAN_Lamp_Right_Front_Parking_Defective | 101 | 2019-02-15T00:00:00Z | 2019-02-19T00:00:00Z | 46331 | 0 |
| 1571 | CAN_Lamp_Right_Front_Parking_Defective | 92 | 2019-02-15T00:00:00Z | 2019-02-19T00:00:00Z | 111378 | 3700 |
| 1824 | CAN_Lamp_Right_Low_Beam | 87 | 2019-02-15T00:00:00Z | 2019-02-19T00:00:00Z | 76895 | 13200 |

channels_CAN All | vehicleid 1302 | channels_IO All

## I/O Channels

| CHANNEL | CHANNEL | CHANNEL | CHANNEL |
|---|---|---|---|
| 25 | - | - | 1 |
| *Ambient Temperature (CAN)* | *Coolant Temperature (CAN)* | *Crash* | *Current Gear* |
| **CHANNEL** | **CHANNEL** | **CHANNEL** | **CHANNEL** |
| 0 | 0 | 0 | 22210 |
| *Door* | *Duress* | *Emergency Light Bar* | *Fuel Consumption* |
| **CHANNEL** | **CHANNEL** | **CHANNEL** | **CHANNEL** |
| 109 | 1 | 1 | 10 |
| *Heading* | *Ignition* | *Modem PWR Out* | *Number of Satellites* |
| **CHANNEL** | **CHANNEL** | **CHANNEL** | **CHANNEL** |
| - | 0 | - | 1 |
| *Odometer* | *Park Brake* | *Retarder Active* | *Screen PWR Out* |
| **CHANNEL** | **CHANNEL** | **CHANNEL** | **CHANNEL** |
| 25100 | 0 | - | 14 |
| *Service Distance* | *Siren* | *Speed (CAN)* | *Speed (SAT)* |

Temperature
45 °C
40 °C
35 °C
30 °C
25 °C
20 °C
15 °C
10 °C
2/15 20:00
2/16 00:00
2/16 04:00
2/16 08:00
2/16 12:00
2/16 16:00
2/16 20:00
2/17 00:00
2/17 04:00
2/17 08:00
2/17 12:00
2/17 16:00
IVE_Temperature Current: 23.00 °C
CAN_ISO_Ambient_Temperature Current: 24.15 °C
Voltage
15 V
14 V
13 V
12 V
11 V
10 V
9 V
8 V

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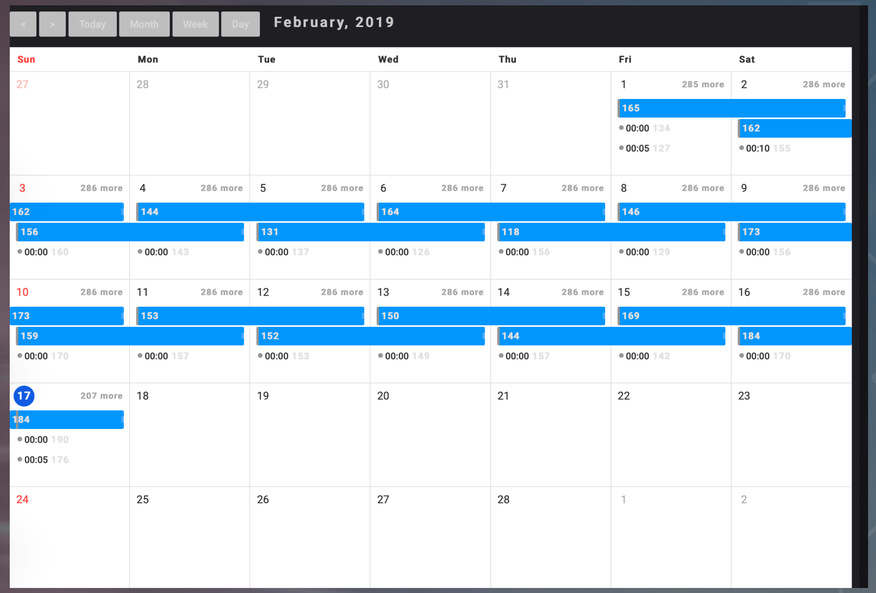
# Custom Panels

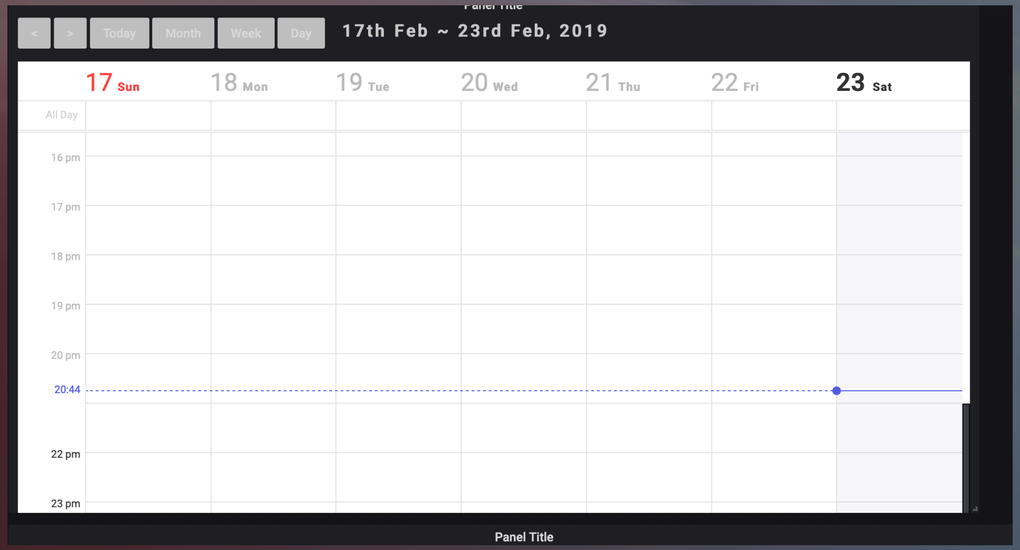
# Calendar Controls with Drill Down

Simple Visual Aid for Scheduling

Time Series

Drill up and Down

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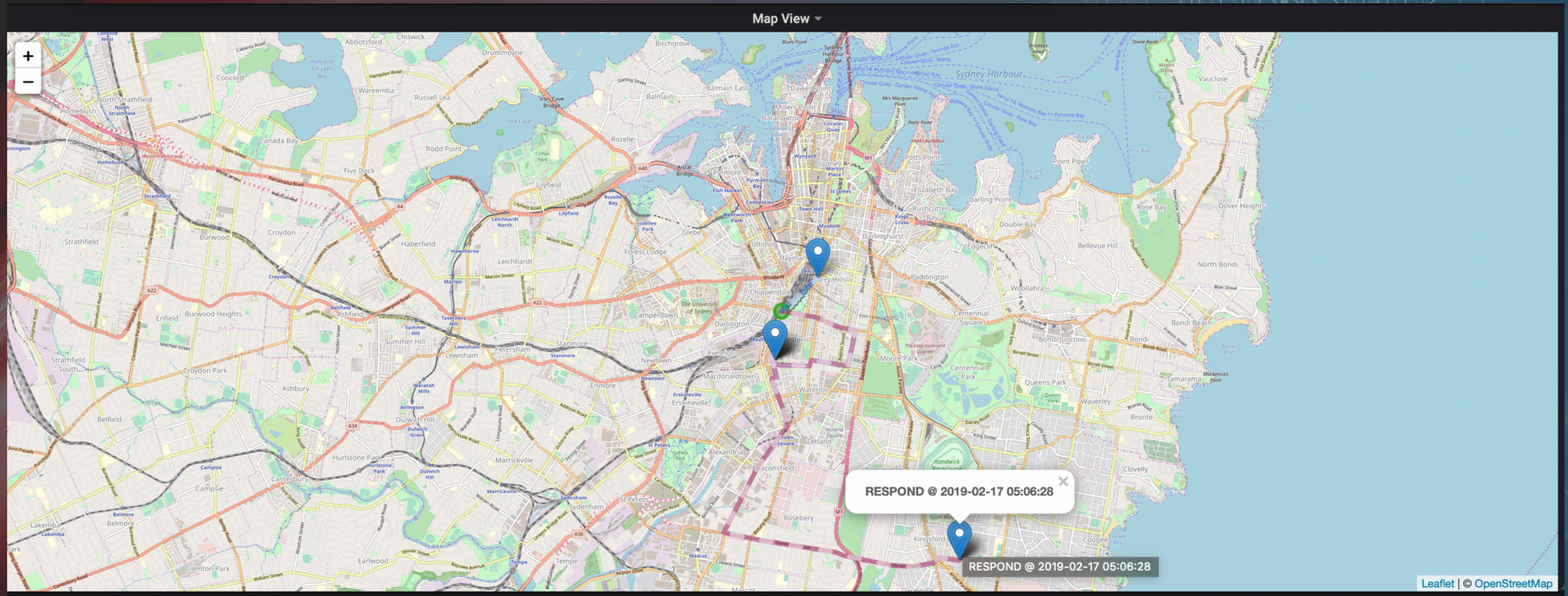
# World Map

Allows Assembly of Points to Line

Display key Waypoints

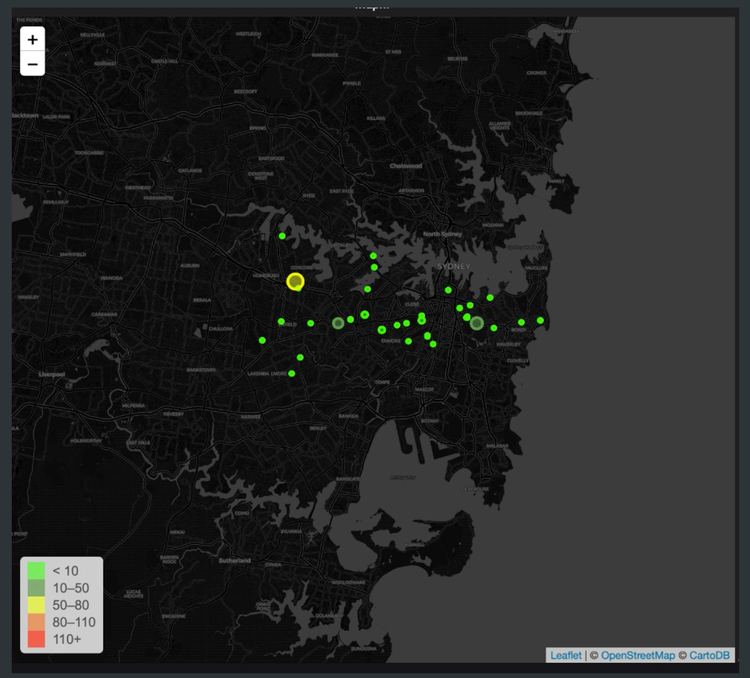


# Whats Next?

# Plugins

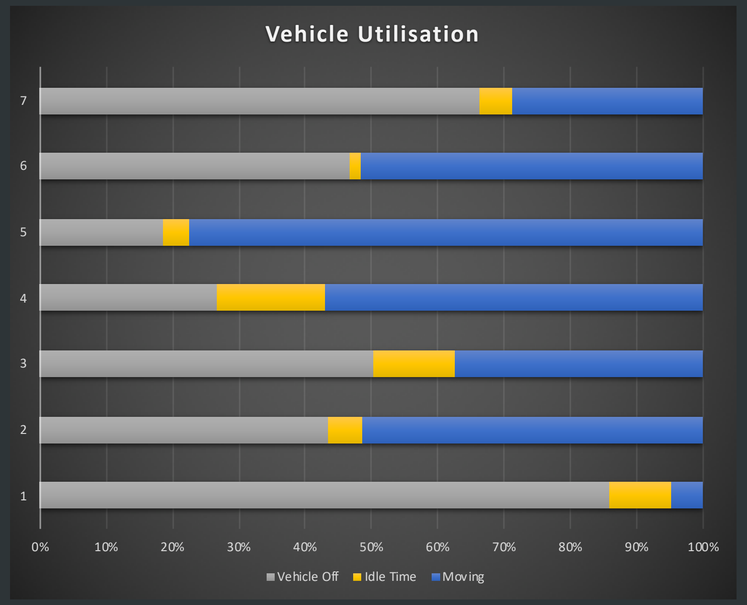
## World Map

Directly display point, line, polygon from PostGIS (+ GeoJSON)




## Horizontal Charts

100% Stacked Line
Sparkline
Gannt Chart




## Realtime Map Tracking

Kafka / MQTT datasource
Live updates

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# Infrastructure Components - What we're currently looking into

Postgres / POstGIS

MS SQL Server

Custom Messaging Protocols

Custom Message Queue

Kafka / Apache Spark

Message Queues
Data Aggregation aqnd Caching

Prometheus / Influx / Alerting Engine

Alerting and Anomaly Detection

Data Retrieval and Storage for deep analysis

HBase / Hadoop…

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# Thank You

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