



# Emergency Response

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



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# About Trapeze

Panel Title

98 - Transportation Solutions Software

Panel Title

12 - Operations Globally

Panel Title

85 - Here for The Journey

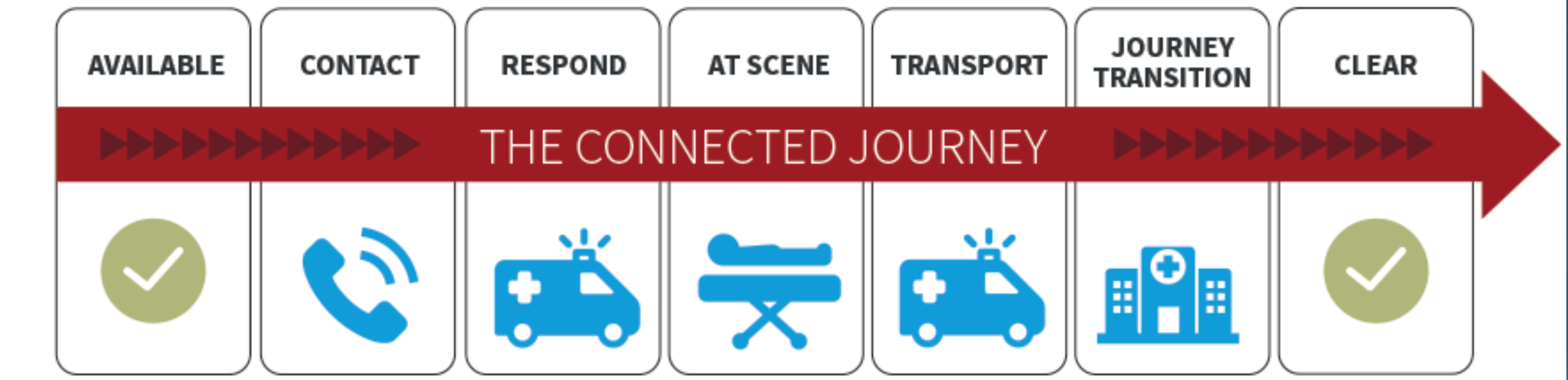








# Emergency Services – Incident Response





# Emergency Services – Incident Response





# Emergency Services – Incident Response





# Emergency Services – Incident Response







# The Data Environment



# Key Components

Postgres / PostGIS

MS SQL Server

Custom Messaging  
Protocols

Custom Message Queue

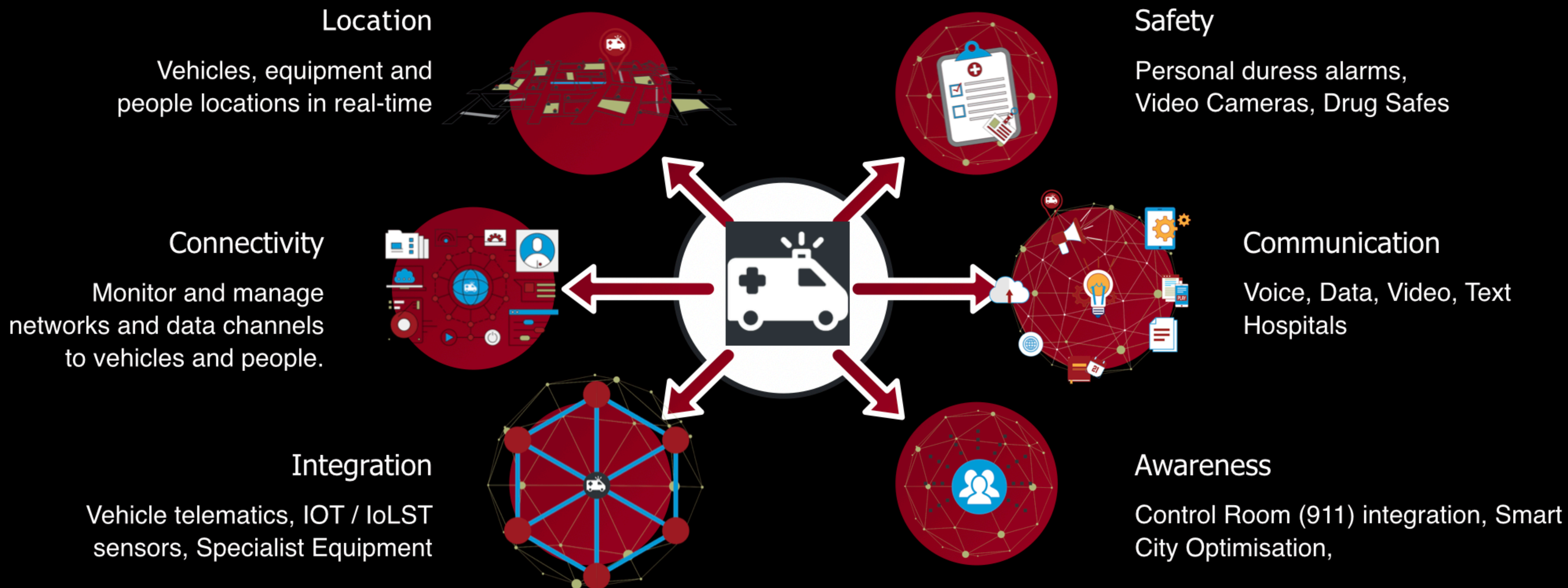
1000+ vehicles

60+ message and  
telemetry channels

24/7/365 uptime

120M + Messages / day







## Location

Vehicles, equipment and  
people locations in real-time



Connectivity





## Connectivity

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



## Integration

Vehicle telematics, IOT / IoLST

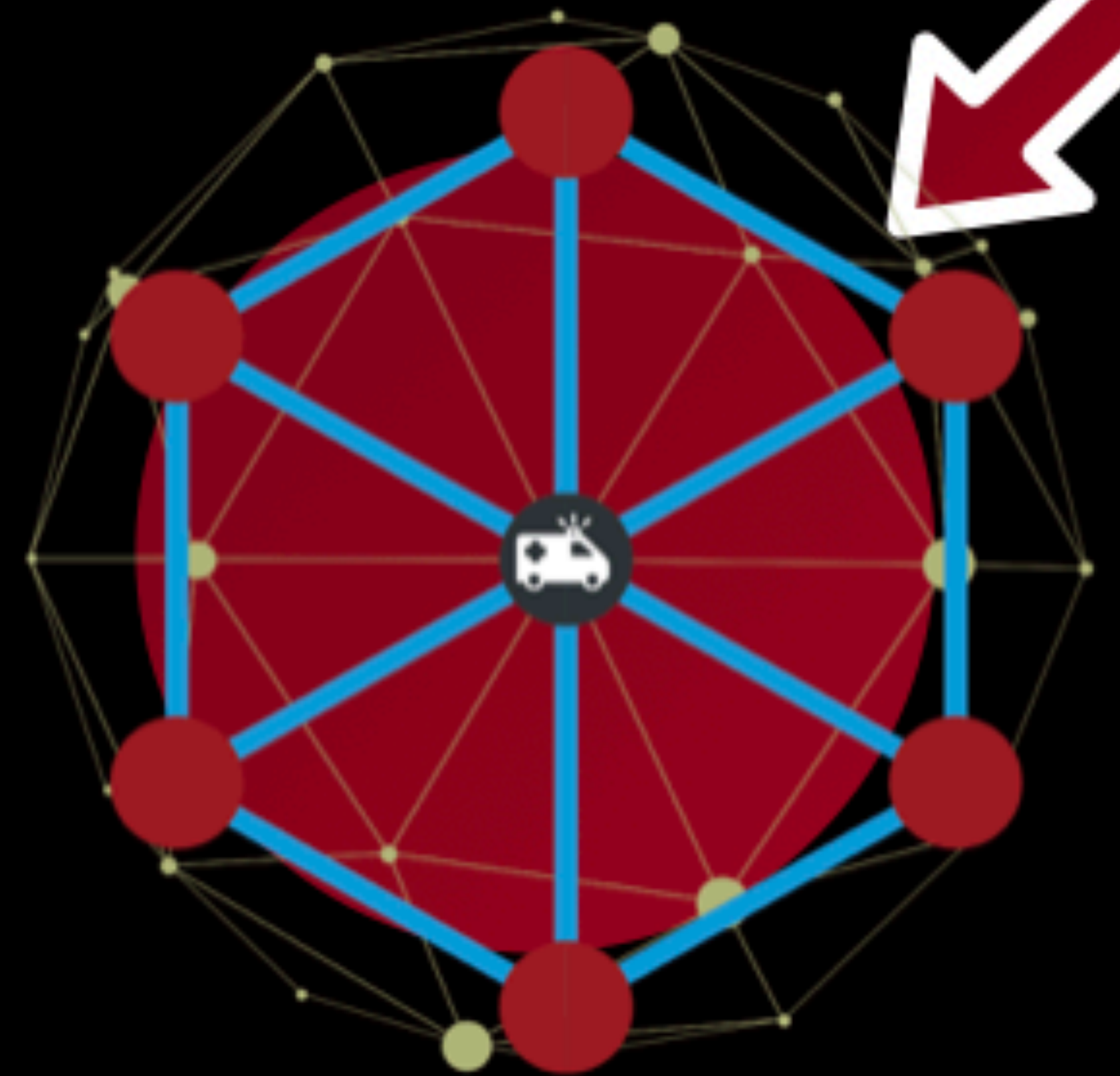




works and data channels  
to vehicles and people.

## Integration

Vehicle telematics, IOT / IoLST  
sensors, Specialist Equipment





Voice, Data, Video, Text  
Hospitals



Awareness

Control Room (911) integration, Smart  
City Optimisation,



Video Cameras, Drug Safes



Communication

Voice, Data, Video, Text  
Hospitals

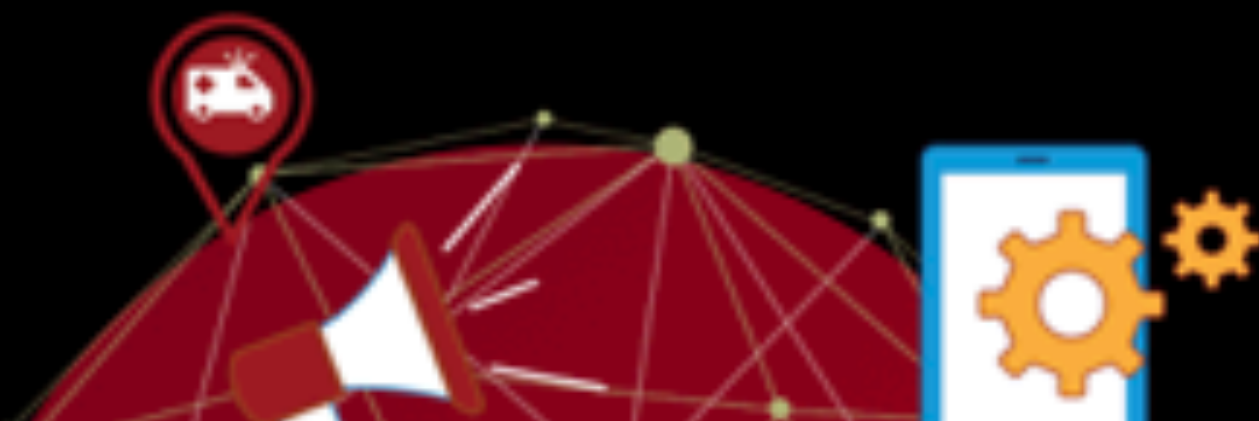
Awareness





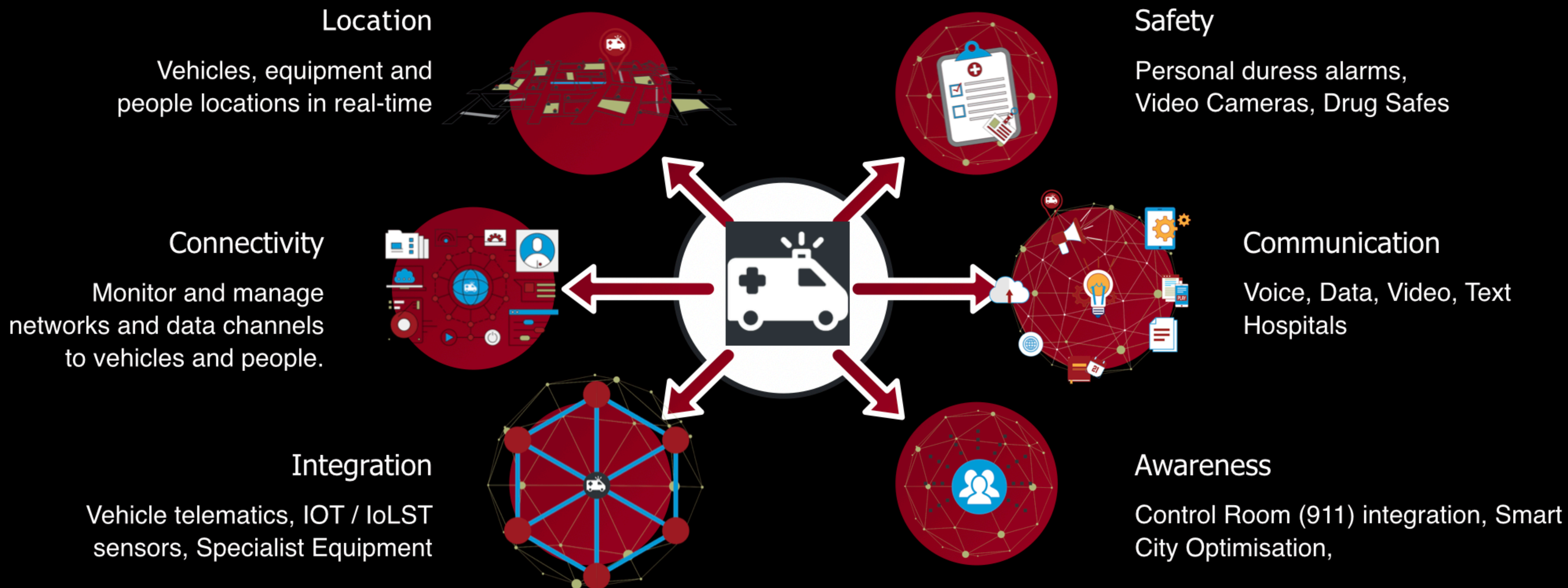
## Safety

Personal duress alarms,  
Video Cameras, Drug Safes



Communication







# Our Key Learnings





# Our Journey

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Bespoke  
Development

Node  
Angular  
React  
ASP.NET  
Web Bootstraps



# Our Journey

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## Bespoke Development

Node  
Angular  
React  
ASP.NET  
Web Bootstraps

## BI Tools / “COTS” Solutions

Power BI  
Tableau  
PRTG Monitoring  
Boutique COTS  
Solutions  
Cognos  
Excel / Access



# Our Journey

Bespoke  
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# Our Journey

Bespoke  
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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





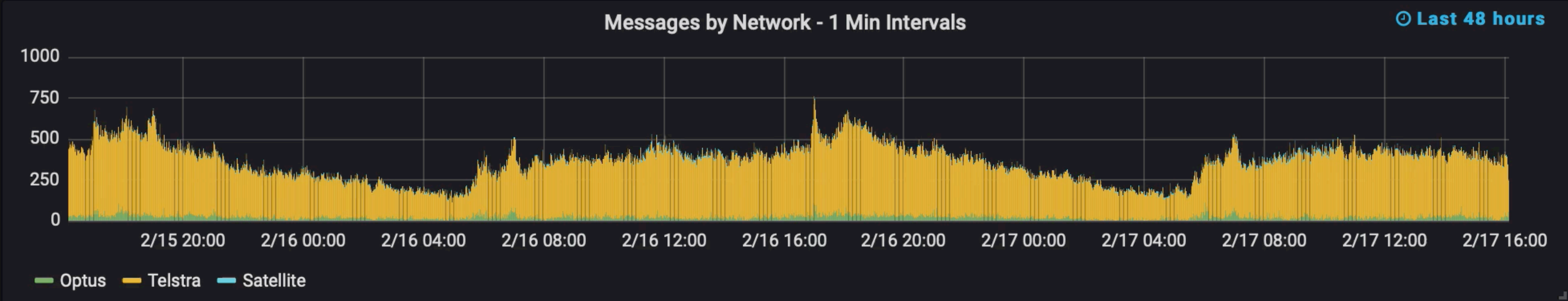
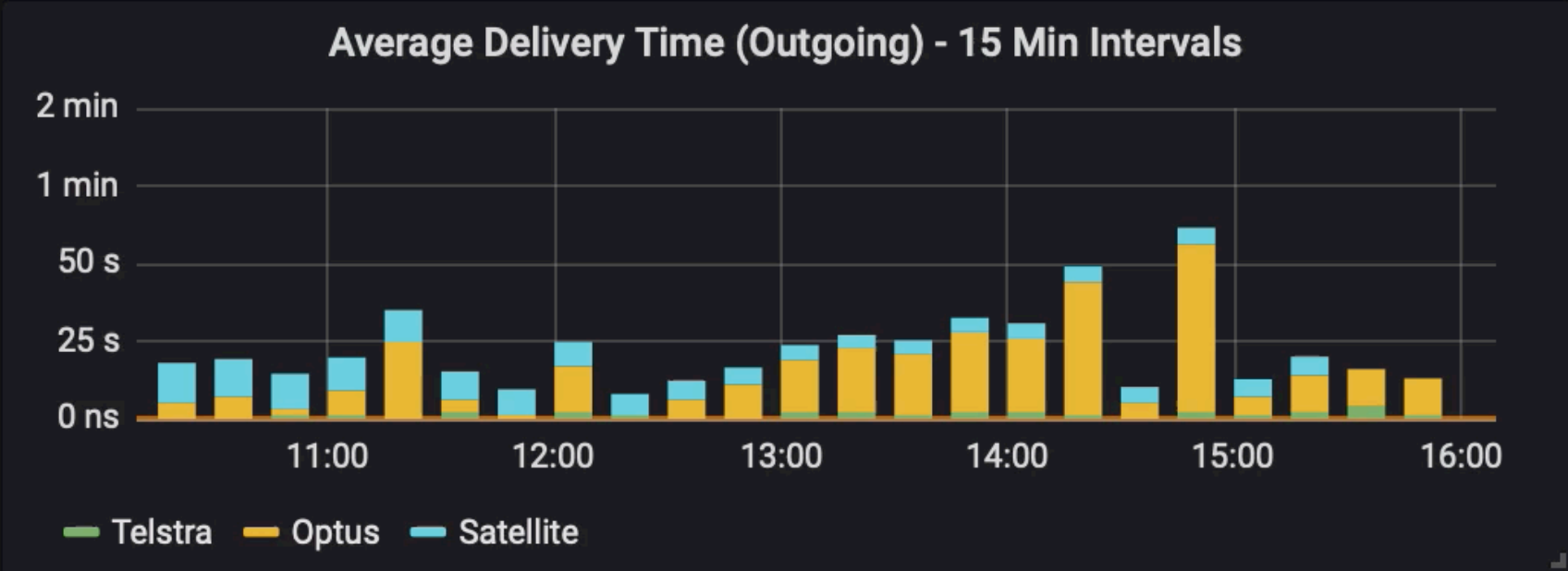
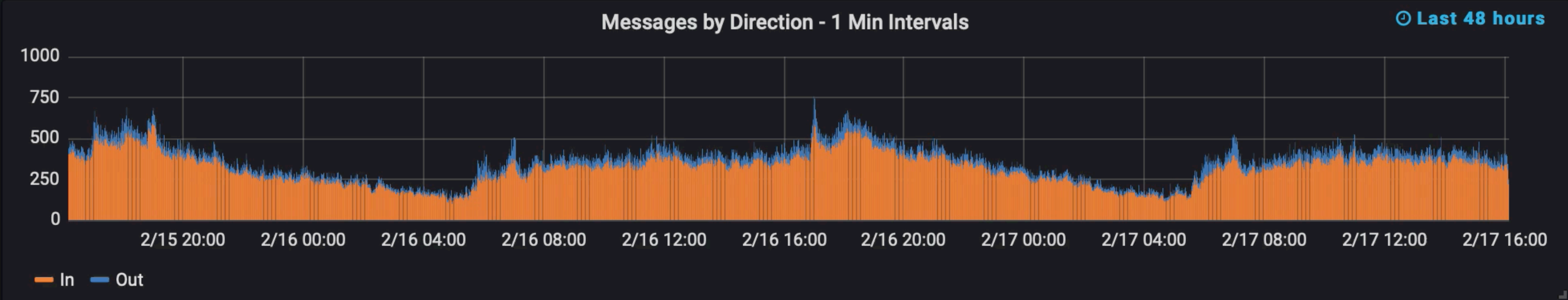
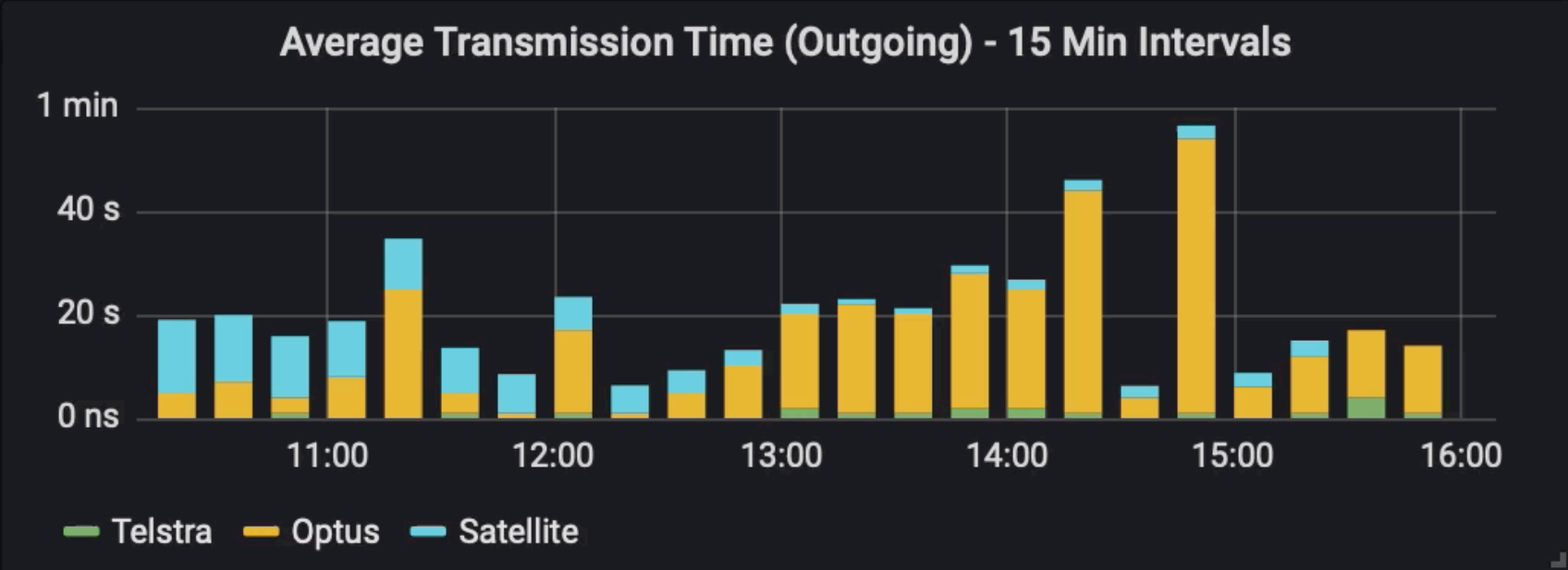
Must be an everyday tool!



# Examples

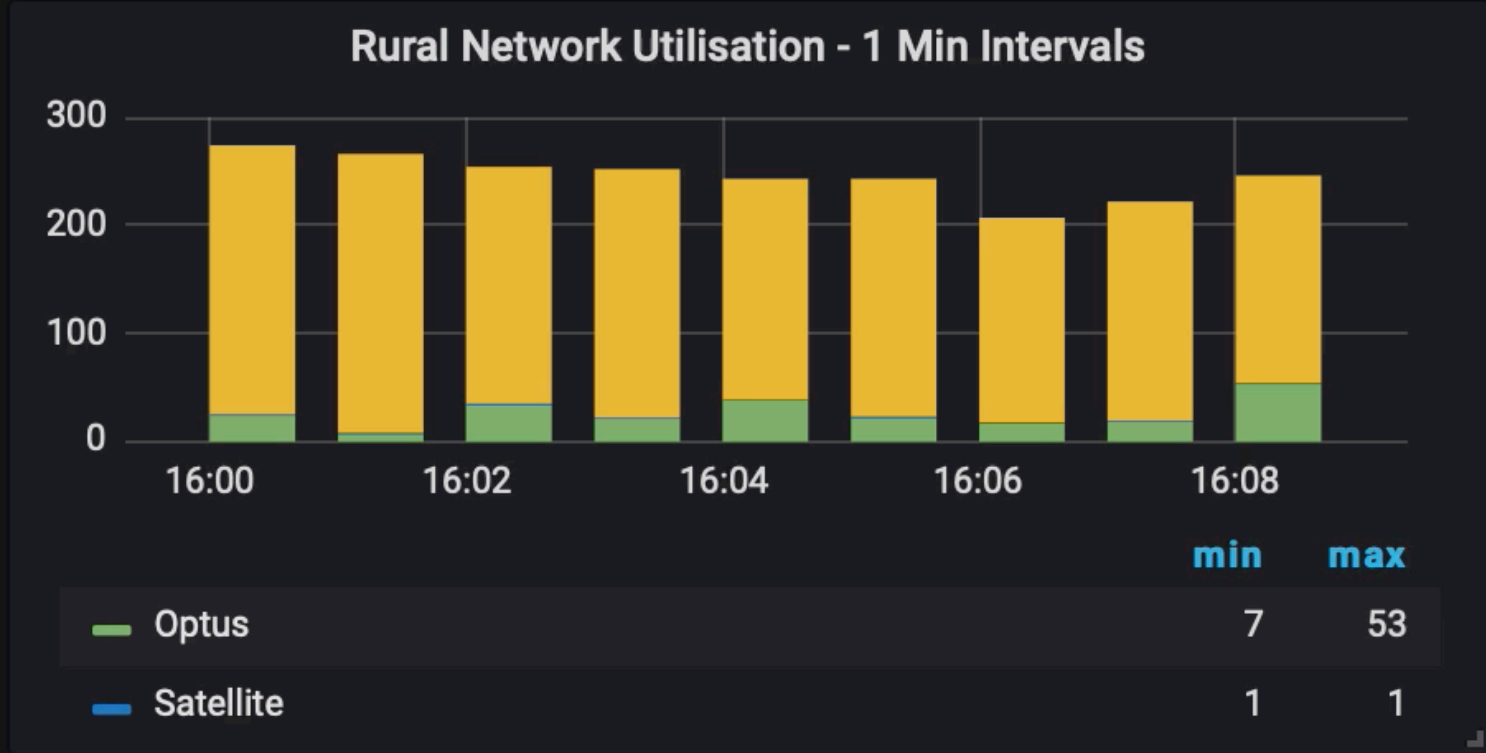
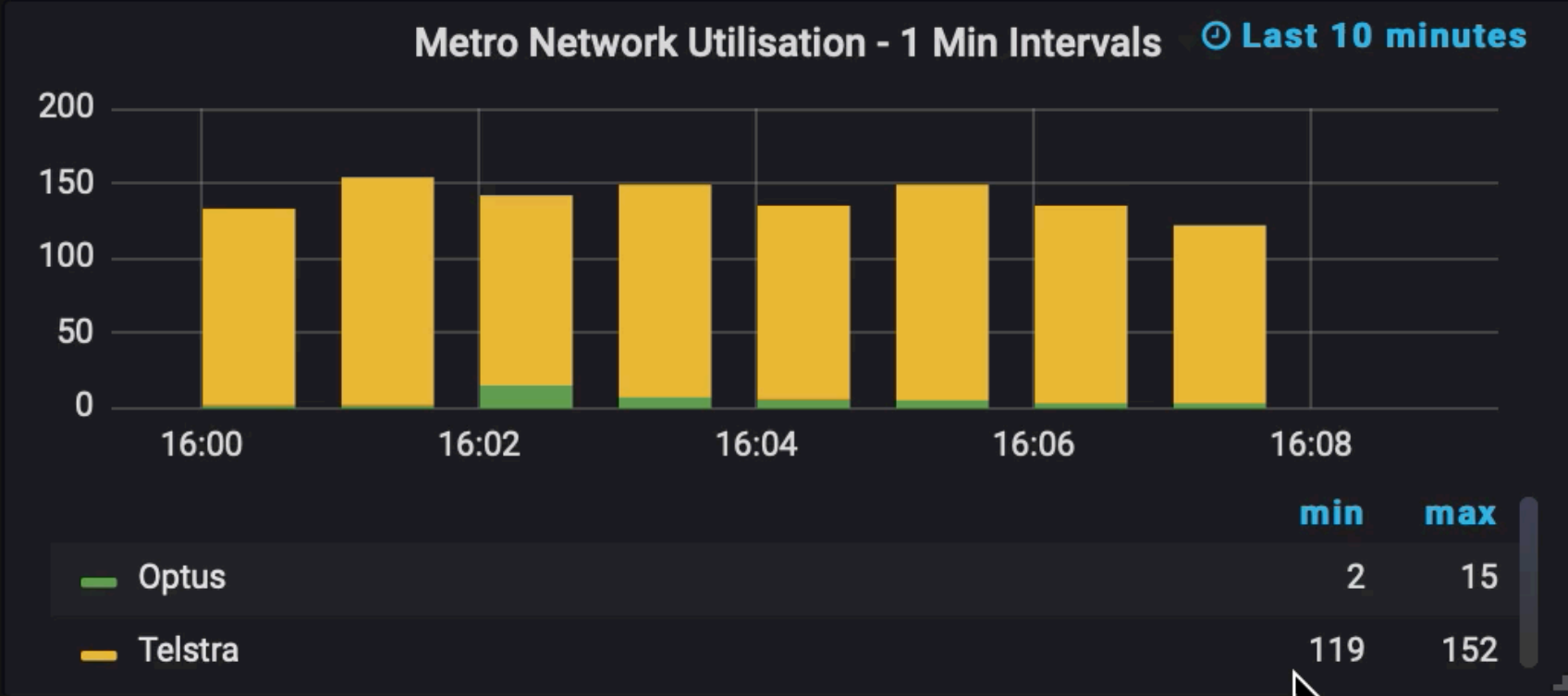
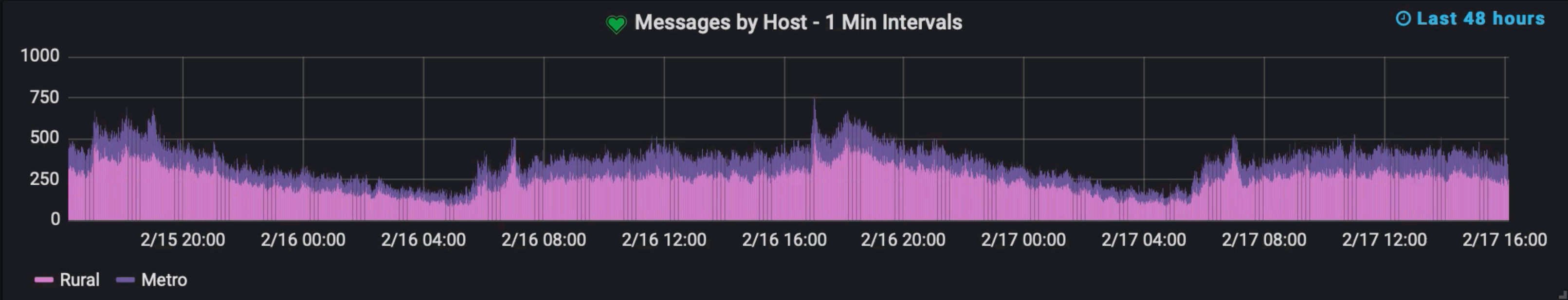




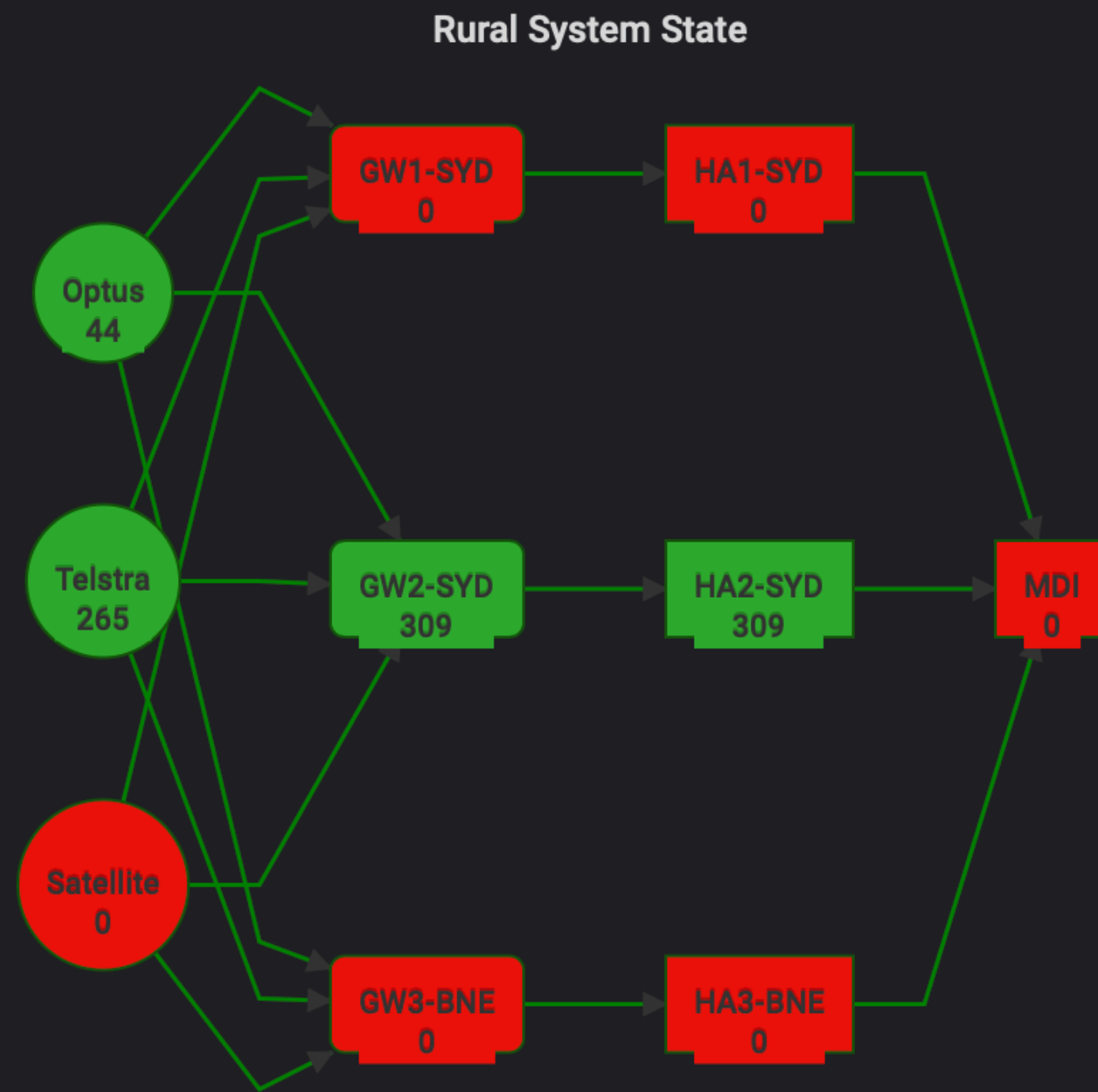


#### Most Recent Message Summary

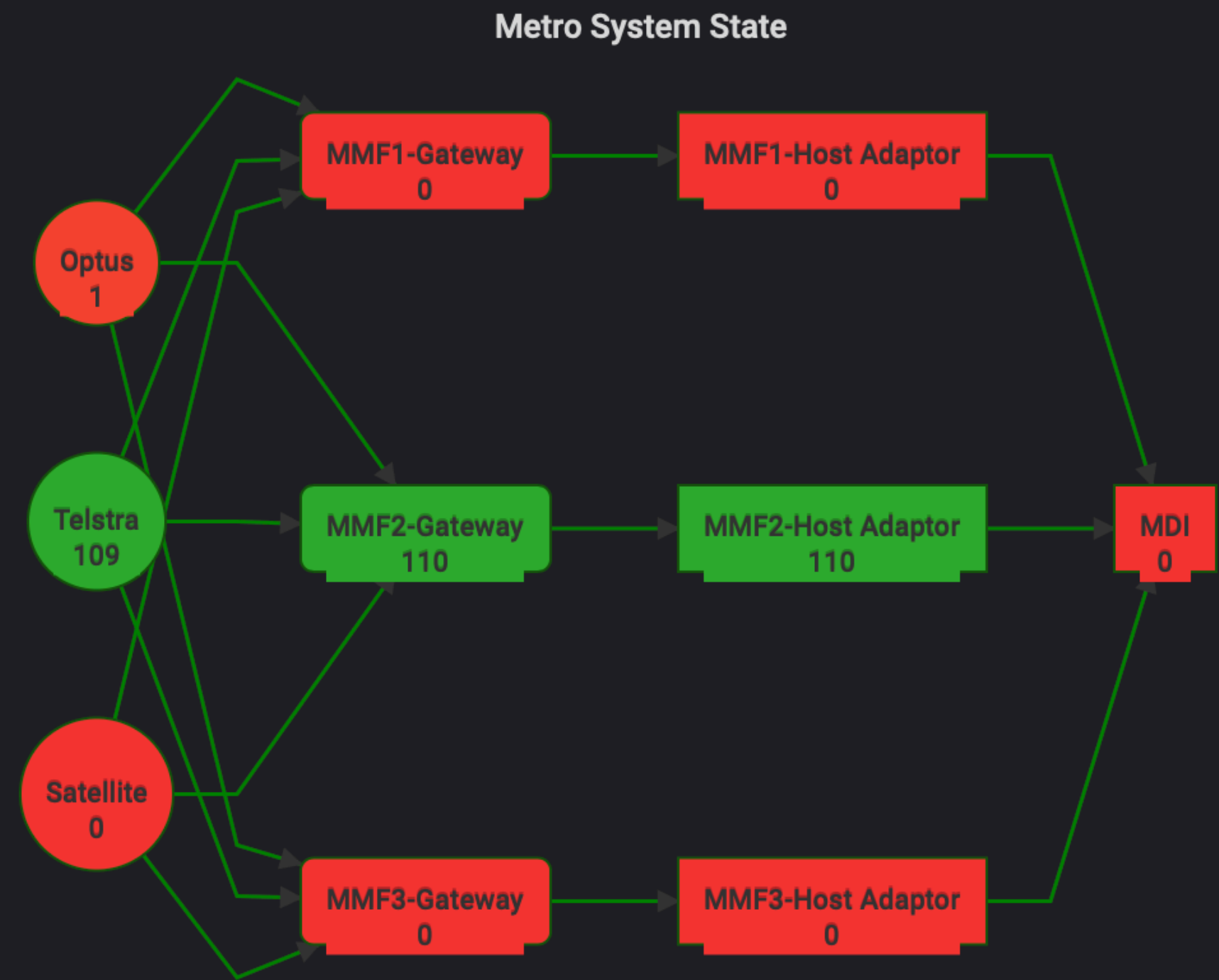
datetimehour1min	host	direction	networkname	No Messages	No Vehicles
2019-02-10T06:11:00Z	Metro	In	Optus	1	1
2019-02-10T06:11:00Z	Metro	In	Telstra	90	68
2019-02-10T06:11:00Z	Metro	Out	Telstra	4	2
2019-02-10T06:11:00Z	Rural	In	Optus	6	4
2019-02-10T06:11:00Z	Rural	In	Telstra	227	120
2019-02-10T06:11:00Z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







		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

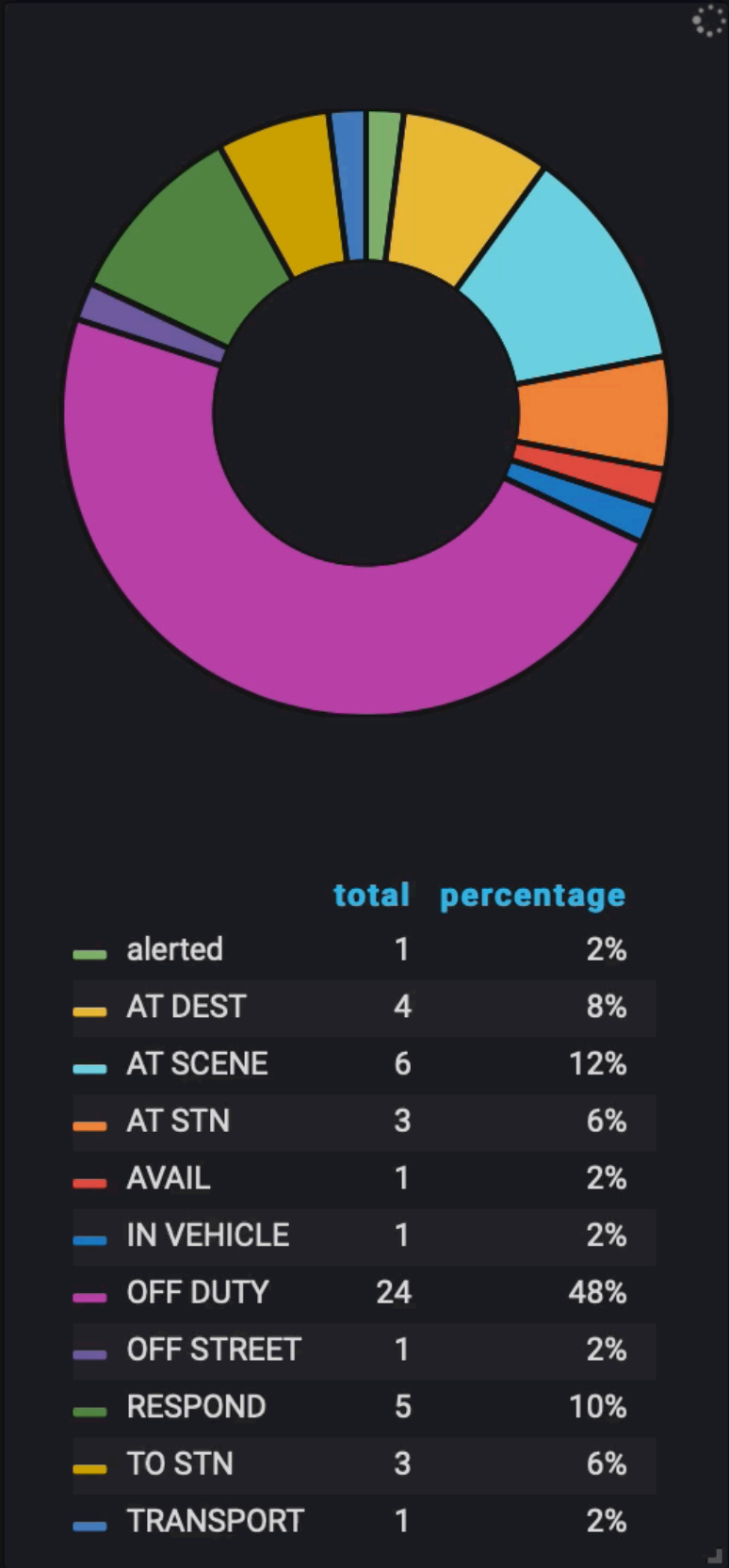


		min	max	avg	total	current
—	Optus	0	1	0.5	1	0
—	Telstra	0	109	54.5	109	0
—	MDI	0	0	0	0	0
—	MMF1_Gateway	0	0	0	0	0
—	MMF1_Host	0	0	0	0	0
—	MMF2_Gateway	110	110	110	110	110
—	MMF2_Host	110	110	110	110	110
—	MMF3_Gateway	0	0	0	0	0
—	MMF3_Host	0	0	0	0	0
—	Satellite	0	0	0	0	0



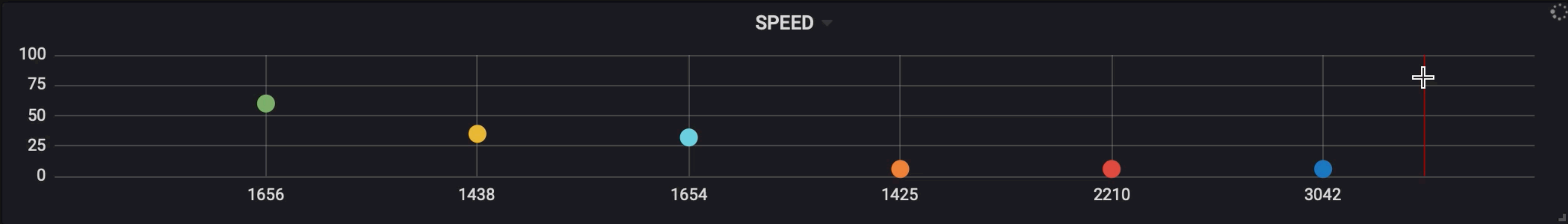
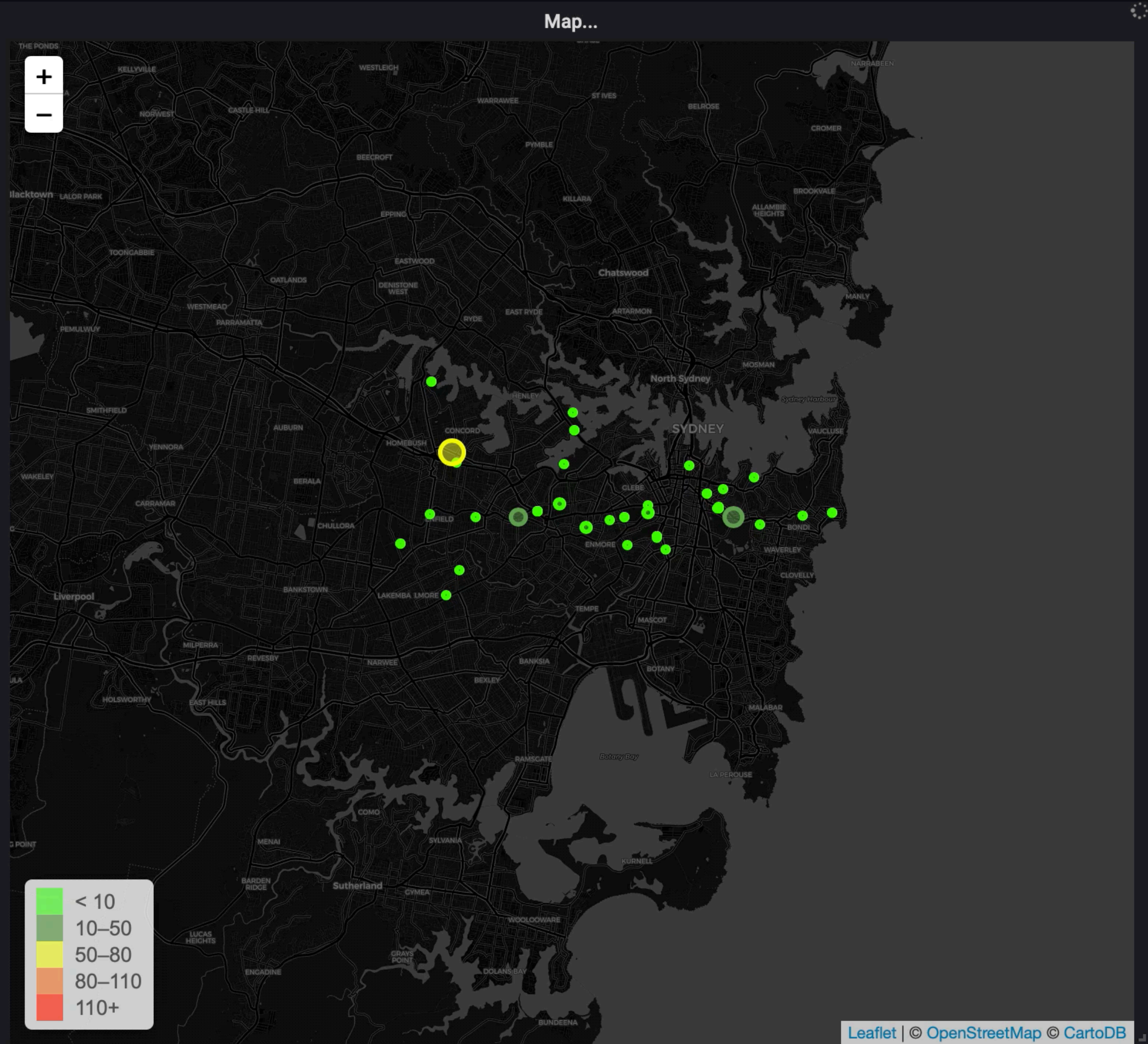
Total Vehicles

50



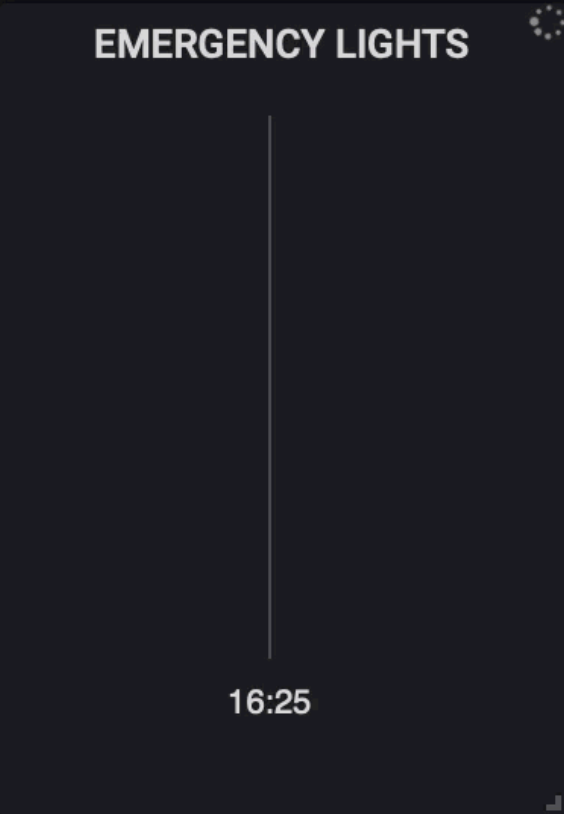
CURRENT RESPONSE (MINUTES)

12.14



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
2_I	5



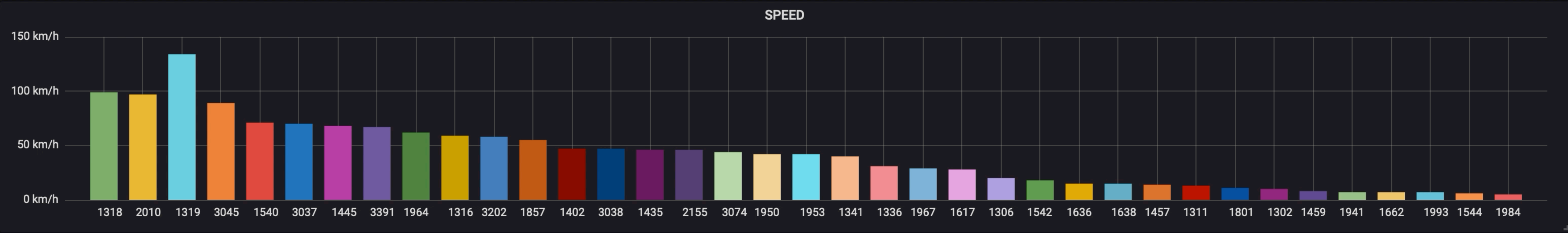
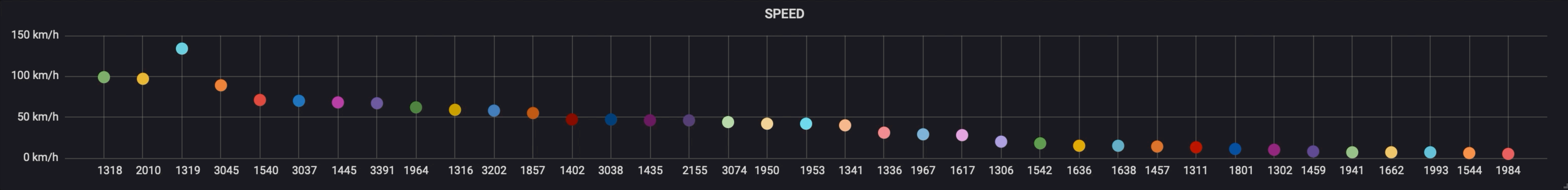


Current Max Speed

99 km/h

Current Max Speed

62 mph





Vehicle 3099 ▾

IGNITION

ON

ENGINE

PARK BRAKE

LIGHTS



SIRENS



GEAR

DOOR

CLOSED

HEADING



OUTSIDE

°C

SMART TE...

39°C

COOLANT

°C

VOLTAGE

14

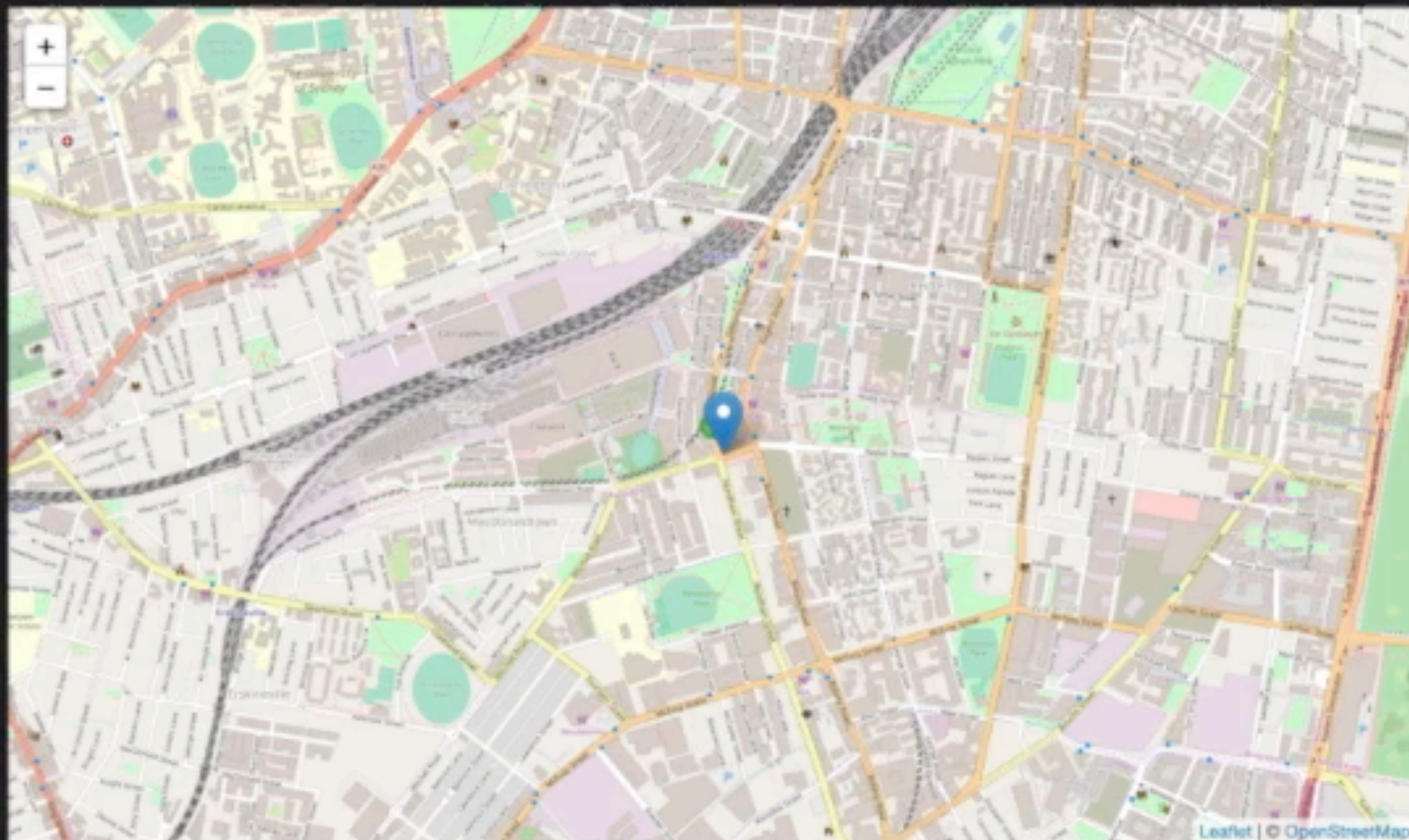
SPEED SAT

66 Kph

ENGINE HRS

FUEL

ODO



SATELLITES

7

DURESS



CRASH



Navigation...

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

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

STATUS

TRANSPORT

SIRENS

LIGHTS

SPEED

7

TEMP (OUT)

N/A

VOLTAGE

14

LAST STATUS

16:45:07

MINUTES IN STATUS

15

PRIORITY

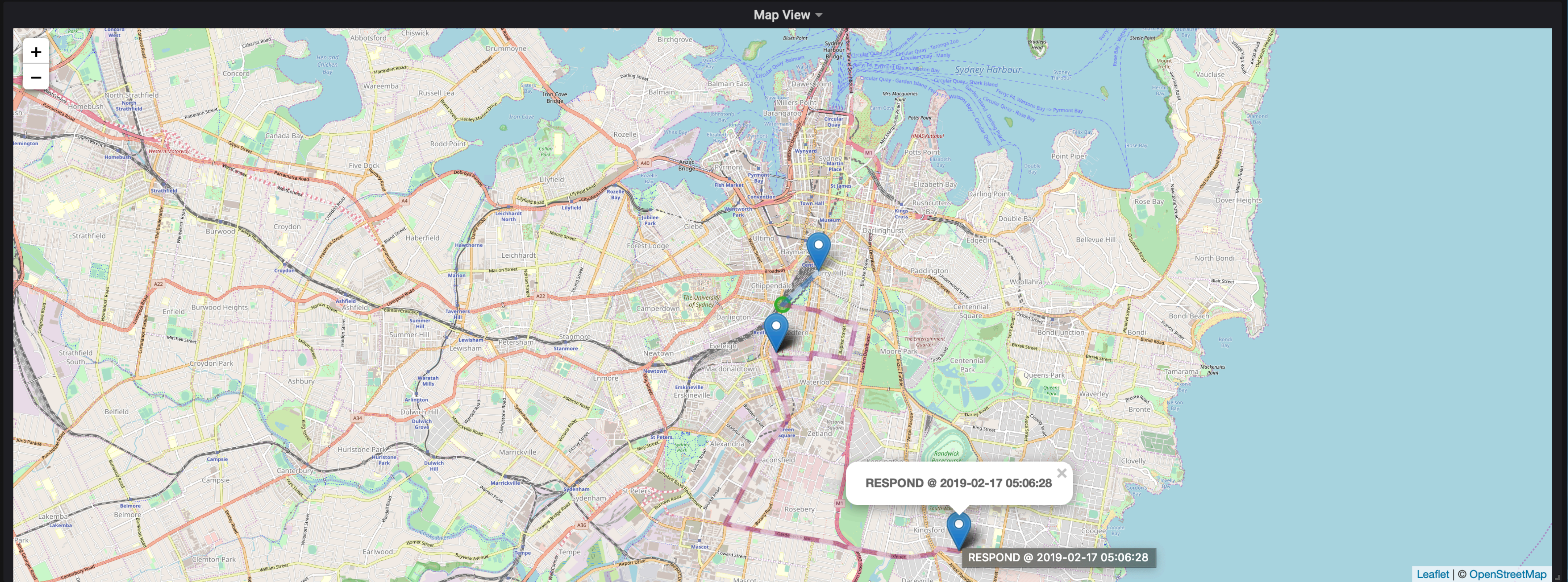
2A

HEADING

←

JOB

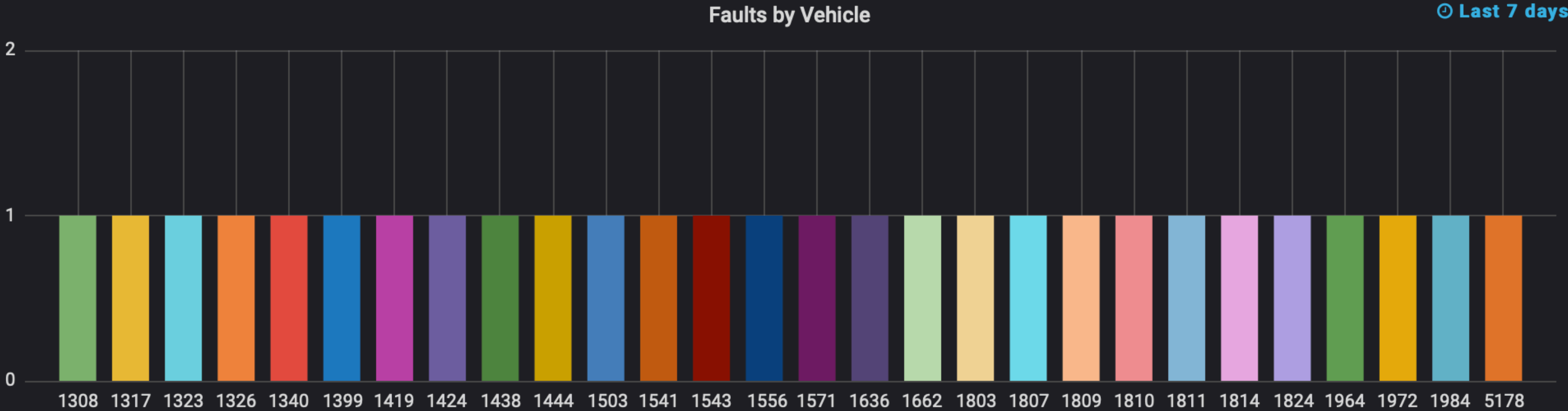
11209







	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%



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	
1824	17/02/19 4:24:27 am	CAN_Lamp_Right_Front_Parking_Defective	1.00	CAN - Right Front Parking	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	
1803	81460	0	17/02/19 6:36:17 am	





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
1804	CAN_Lamp_Coolant_Level_Low	5	2019-02-17 00:00:00	2019-02-19 00:00:00	76885	13800

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

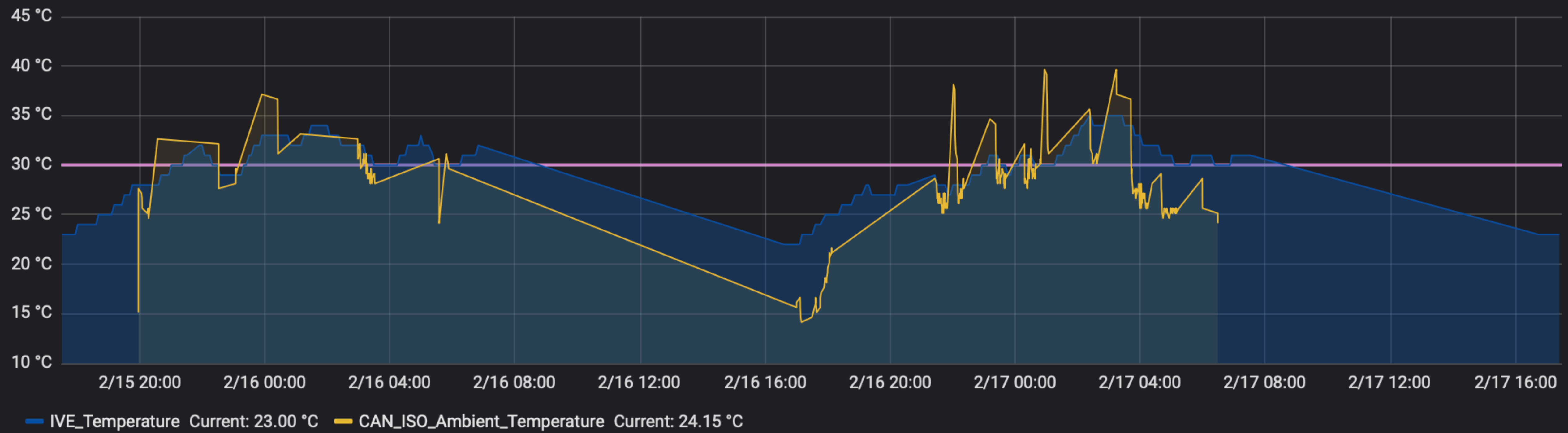


▾ I/O Channels

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



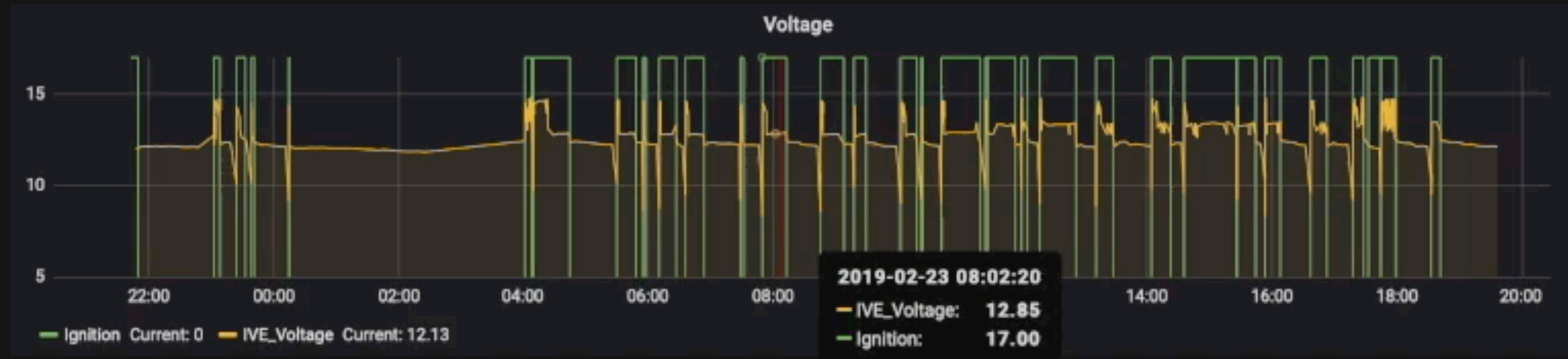
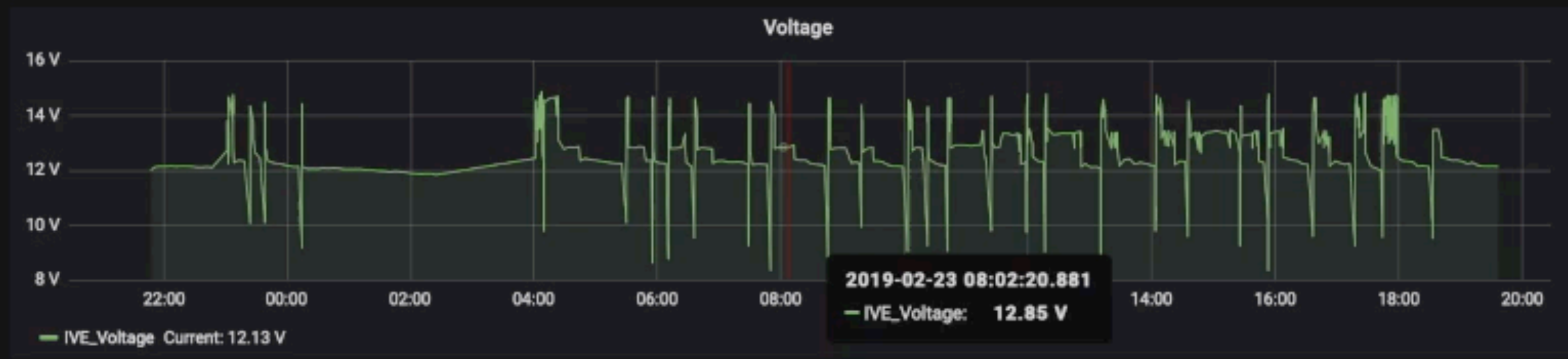
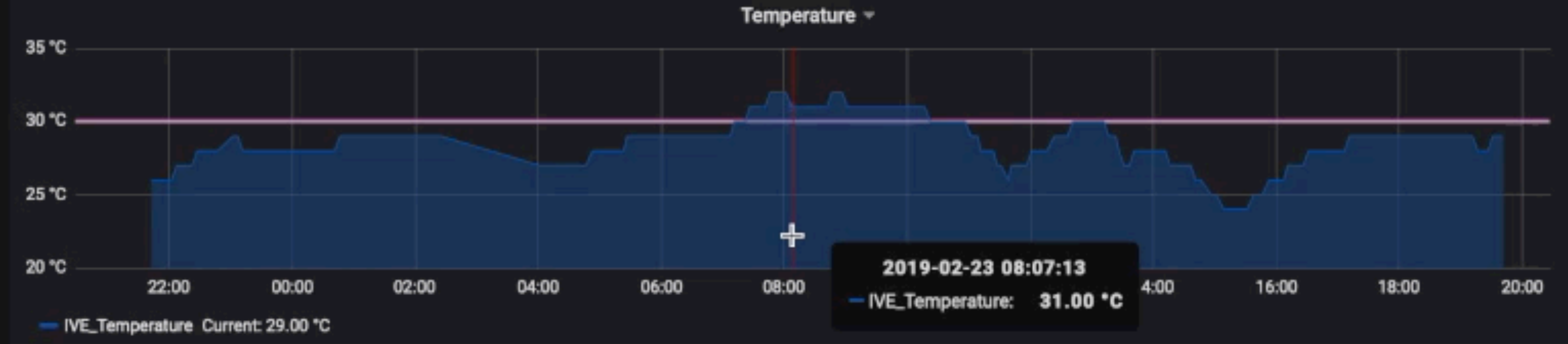
# Temperature



# Voltage









# Custom Panels



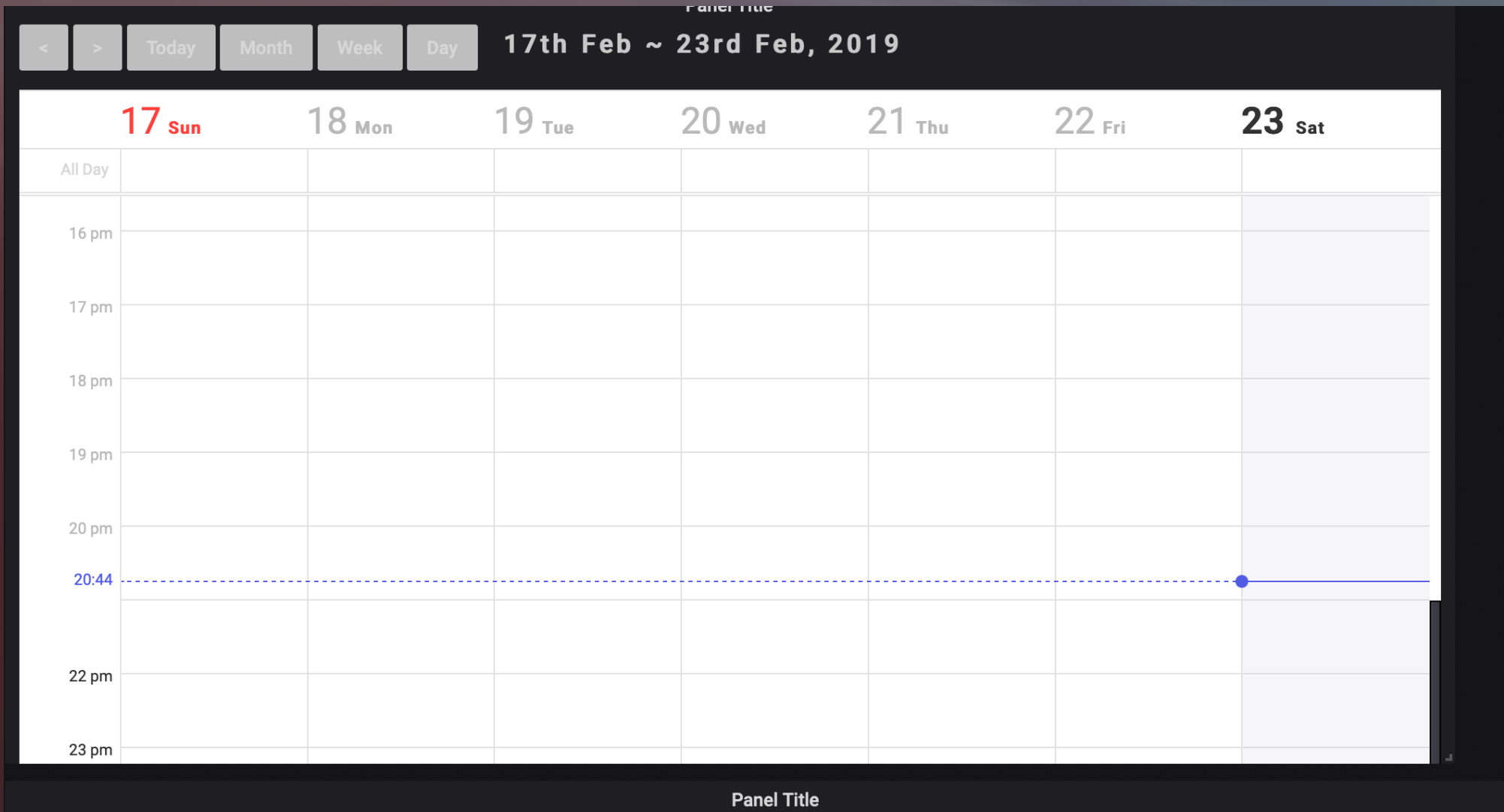
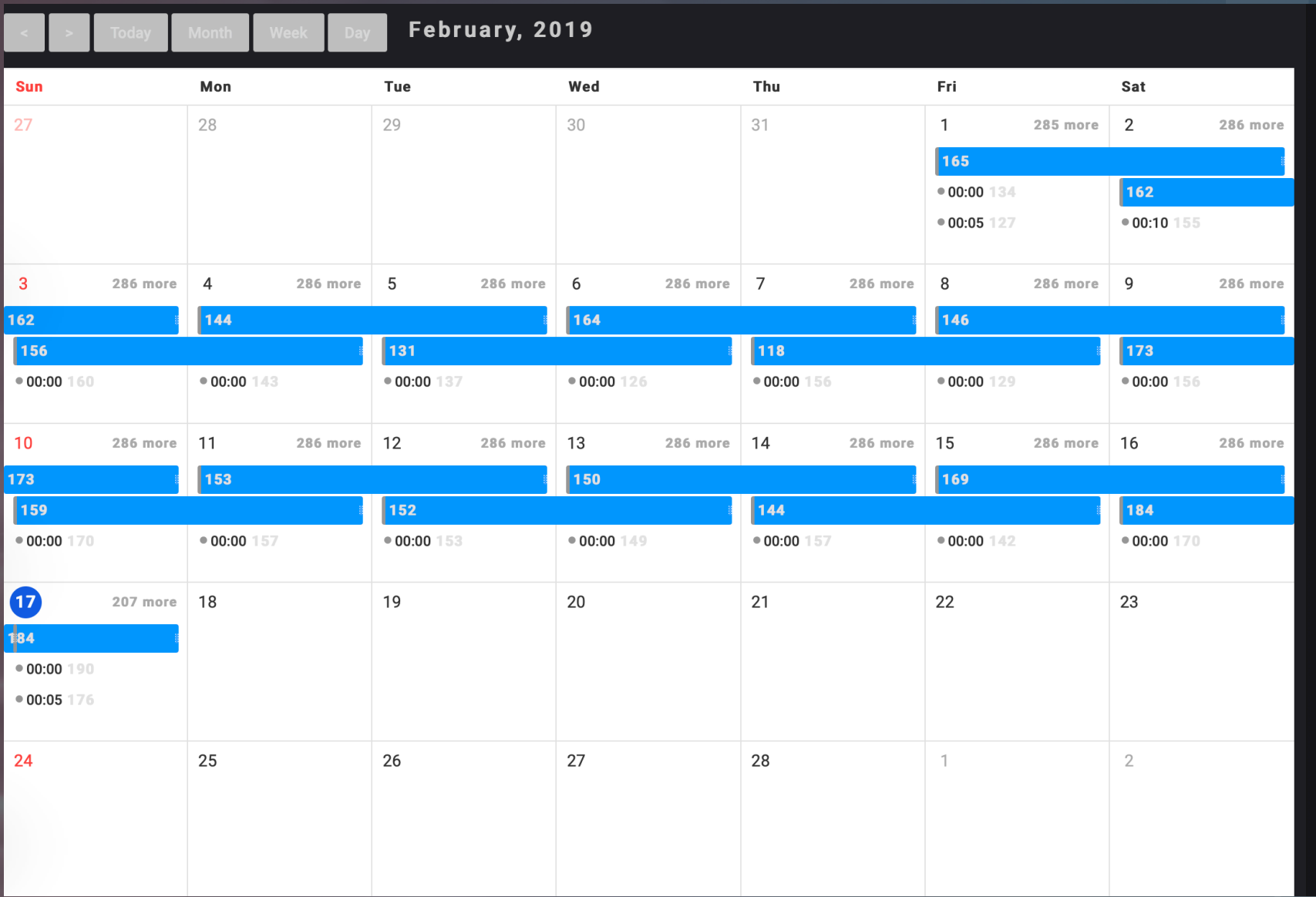


# Calendar Controls with Drill Down

Simple Visual Aid for Scheduling

Time Series

Drill up and Down

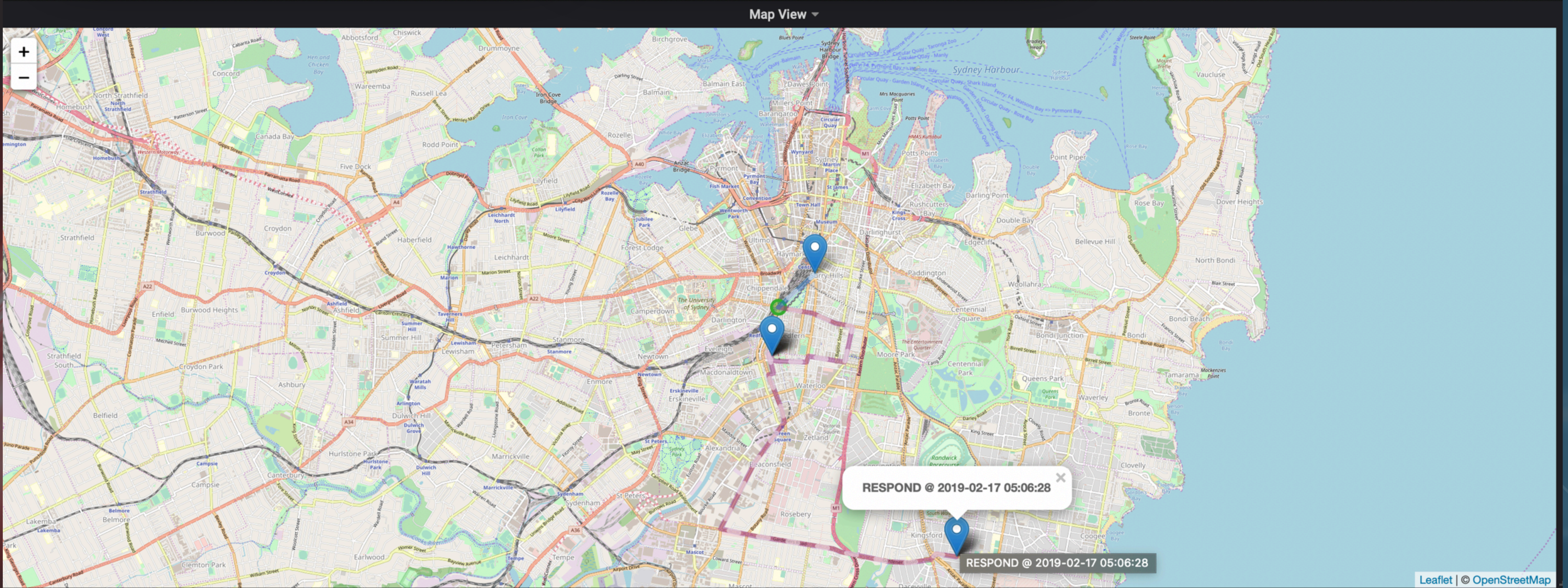




# World Map

Allows Assembly of Points to Line

Display key Waypoints





Whats Next?

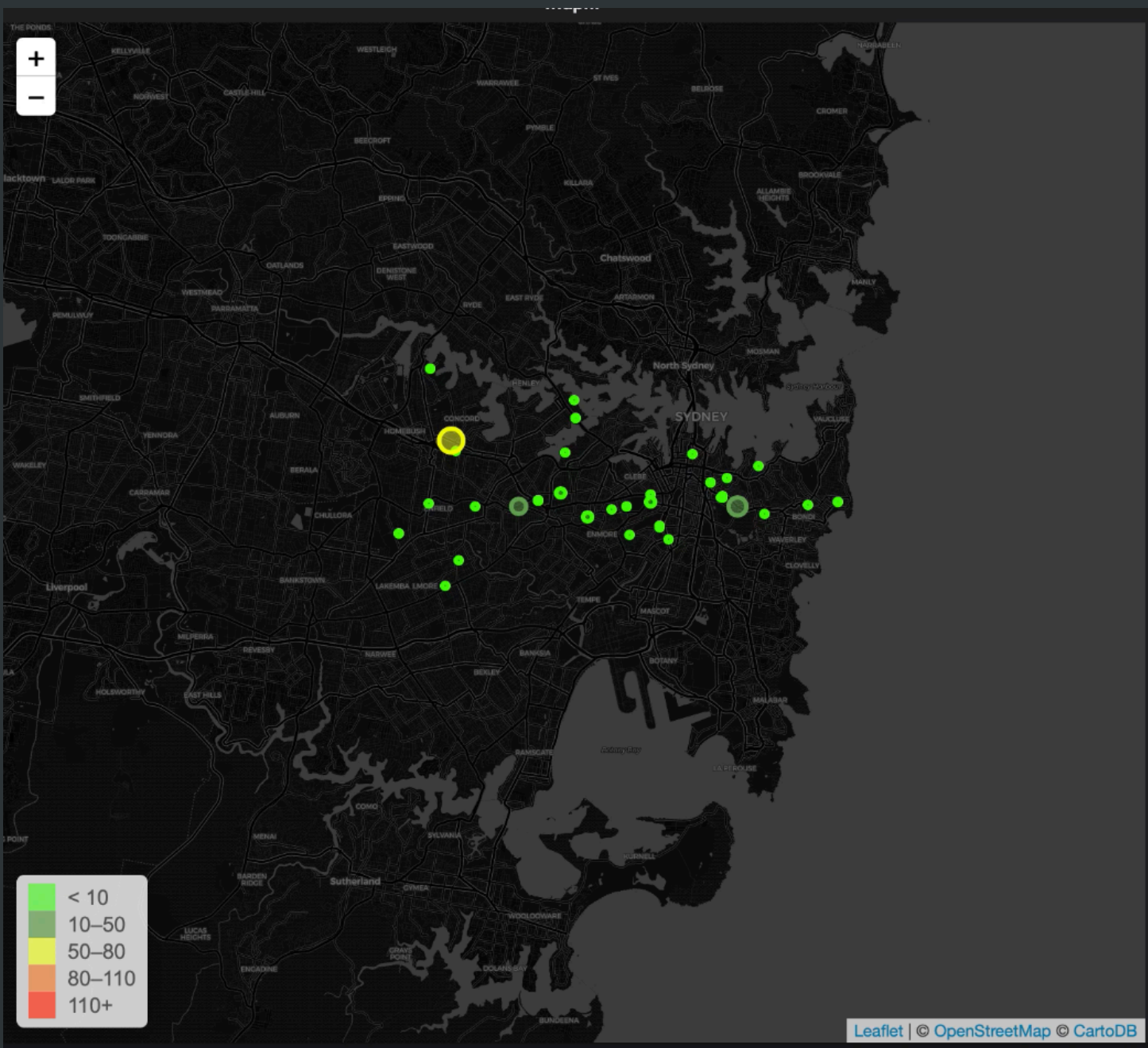




# Plugins

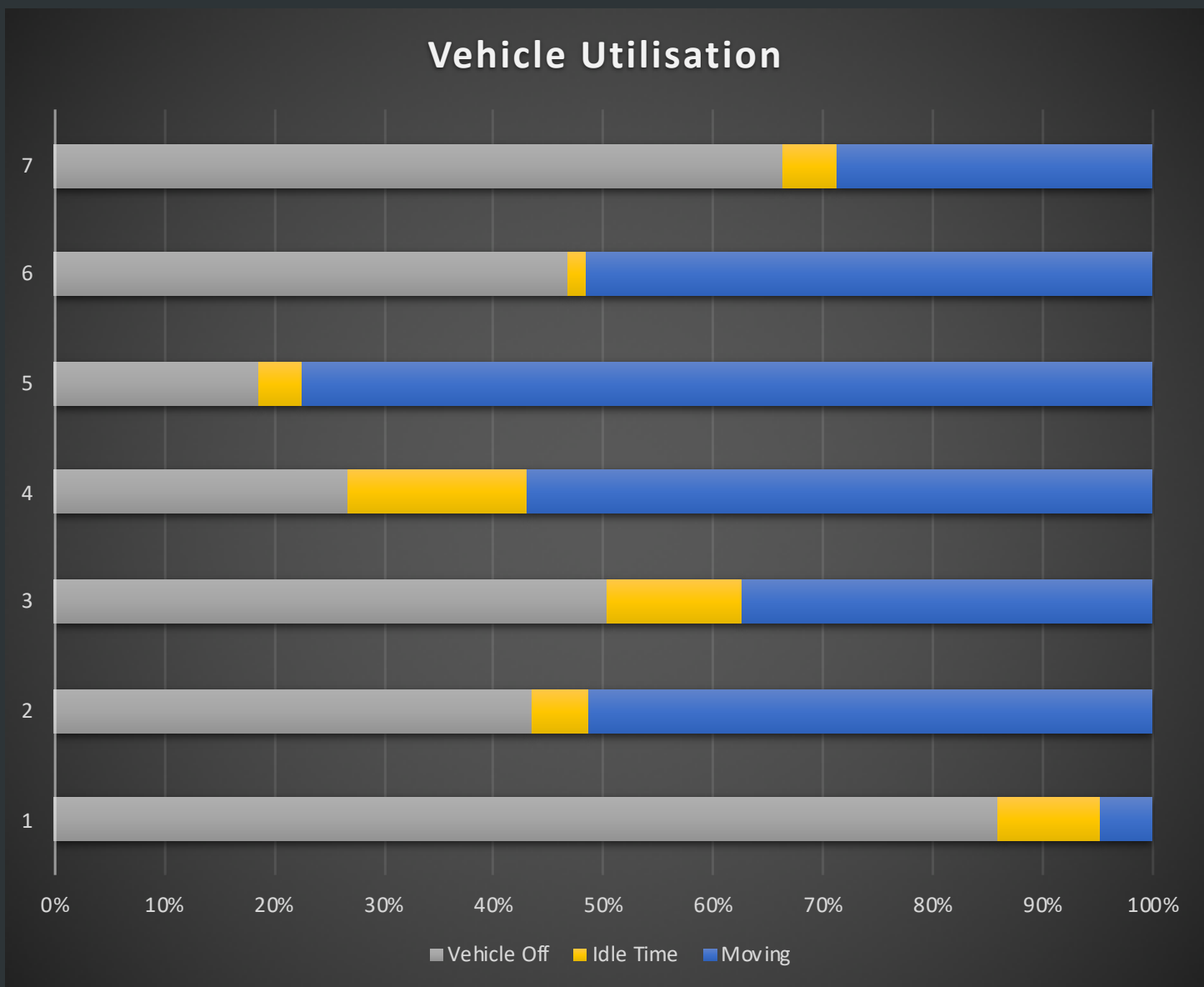
## World Map

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



## Horizontal Charts

100% Stacked Line  
Sparkline  
Gantt Chart



## Realtime Map Tracking

Kafka / MQTT datasource  
Live updates



# Infrastructure Components - What we're currently looking into

Postgres / POGIS

MS SQL Server

Custom Messaging  
Protocols

Custom Message Queue

Kafka / Apache Spark

Prometheus / Influx /  
Alerting Engine

Data Retrieval and  
Storage for deep analysis

Message Queues  
Data Aggregation and Caching

Alerting and Anomaly Detection

HBase / Hadoop...





# Thank You

**James Wetherall**

Group Manager, Emergency Services

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