



Tauranga Transport Operations Centre



Cost-Effective Vehicle Analytics with Axis hardware and Open Source

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Tauranga Transport Operations Centre



The Need, the Challenges

- Ongoing public concern about speeding in the city
- Lack of available data to validate or quantify the issue
- Need for a low-cost, scalable, and automated monitoring solution
- Needs to be simple to consume for the business
- Doesn't need all the bells and whistles
- A little bit of budget available from the safety team (\$10k)
- Limited resource available
- I'm not a data scientist, I'm an IT guy. Baby steps...

Define Objective

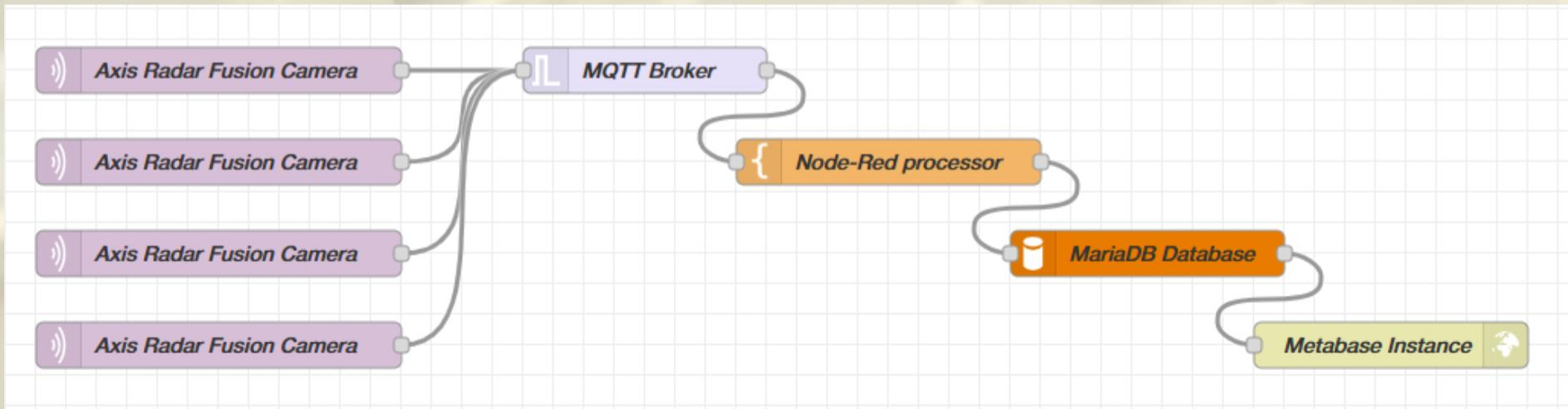
- Determine the extent of the speeding problem
- Collect reliable, real-time vehicle speed data
- Do it on the smell of an oily rag

Draft Design

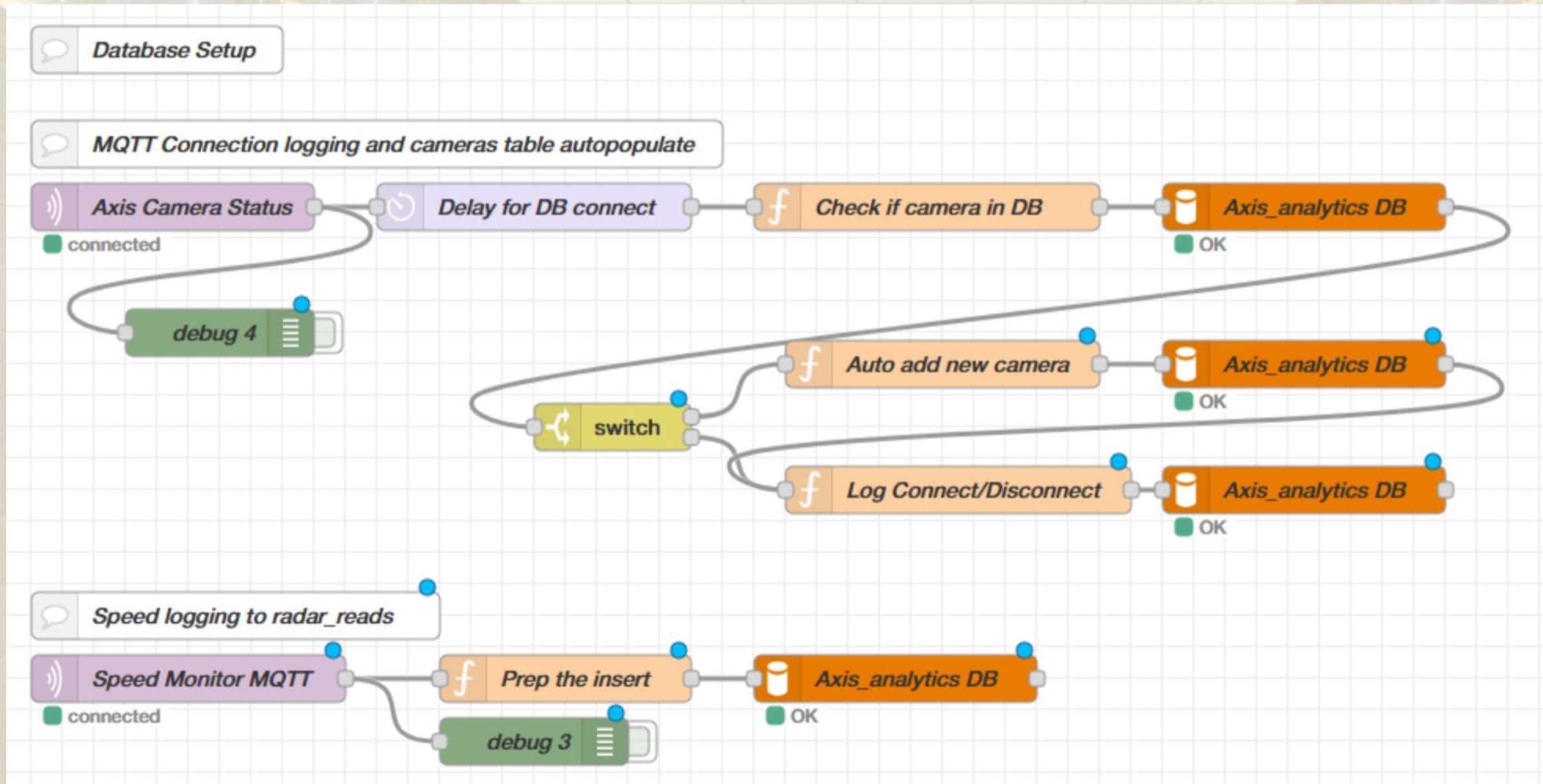
- Deploy an Axis radar fusion camera to monitor vehicle speeds
- Use open-source tools to process, store, and visualize data
- Create an automated pipeline from data capture to reporting

The Solution

- Axis Q1656-DLE radar fusion camera to generate the data
- Mosquitto MQTT broker for message handling
- Node-RED for logic, filtering and functionality
- MariaDB for data storage, Metabase for dashboards

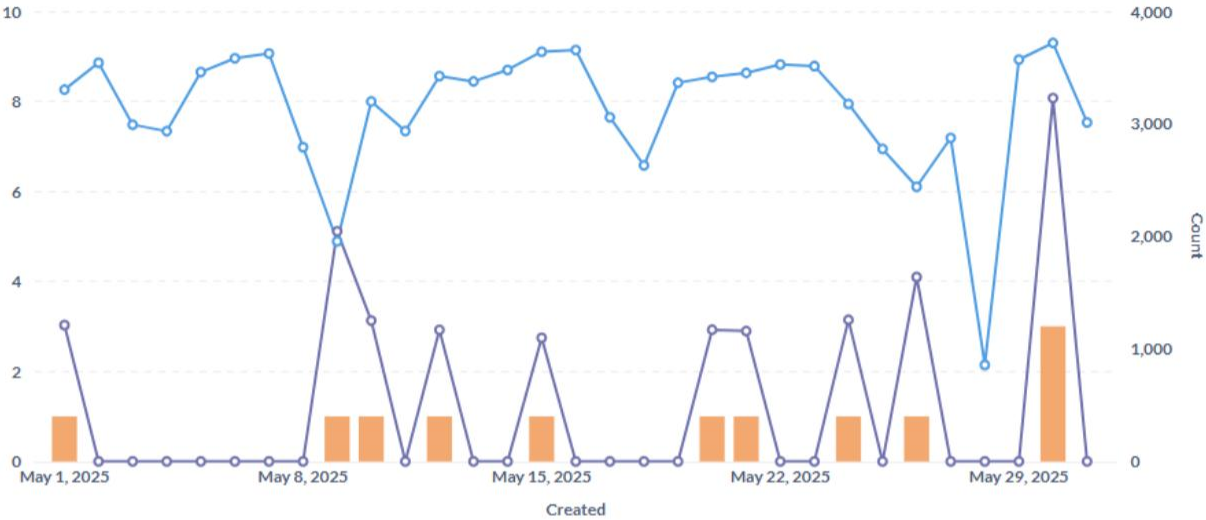


Node-Red flow

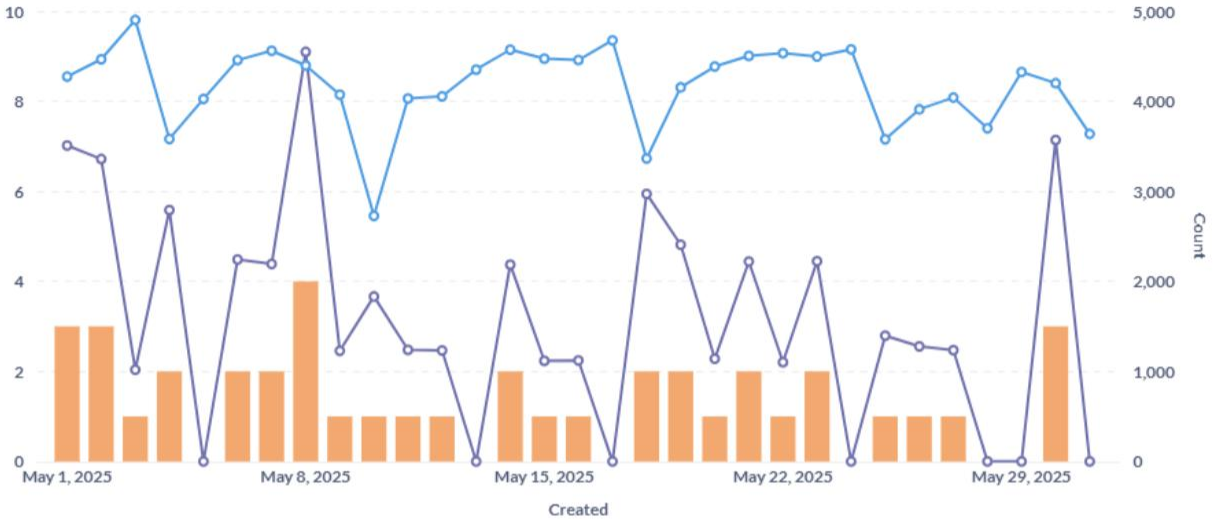


Speeders - May

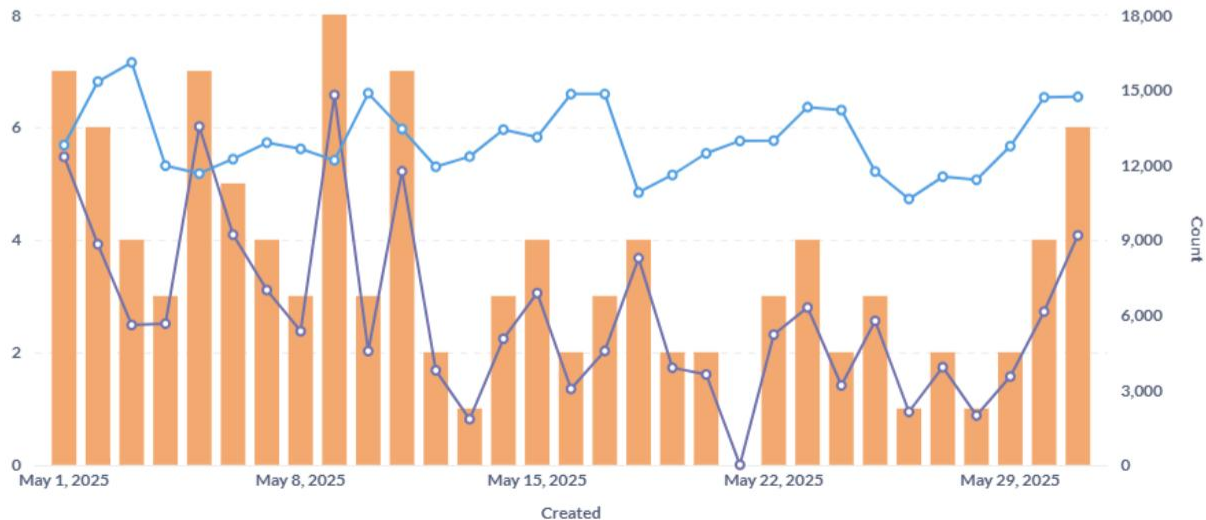
Speeders - May, Waikite



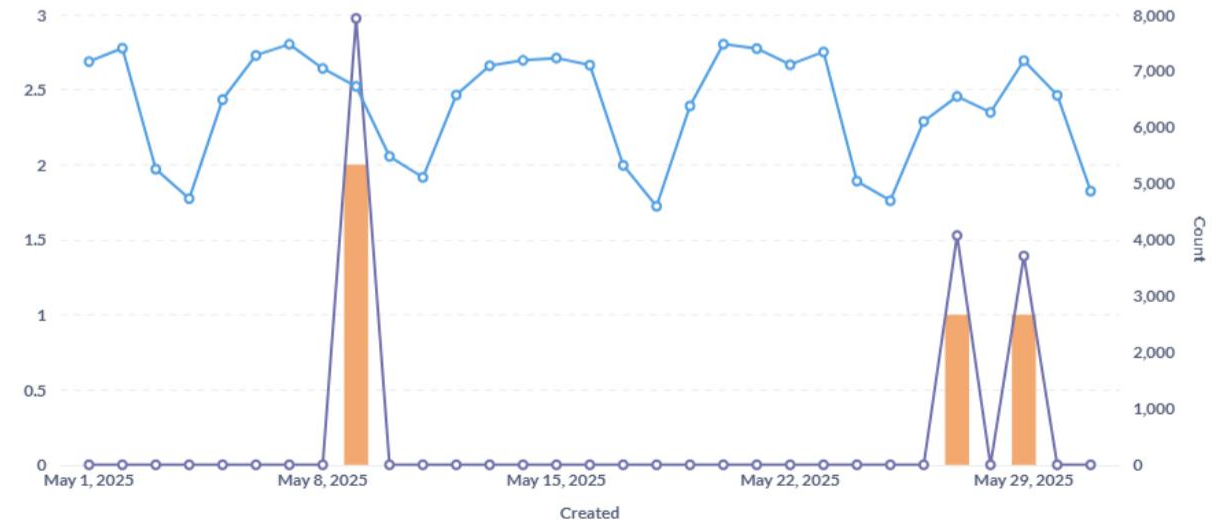
Speeders - May, Levers



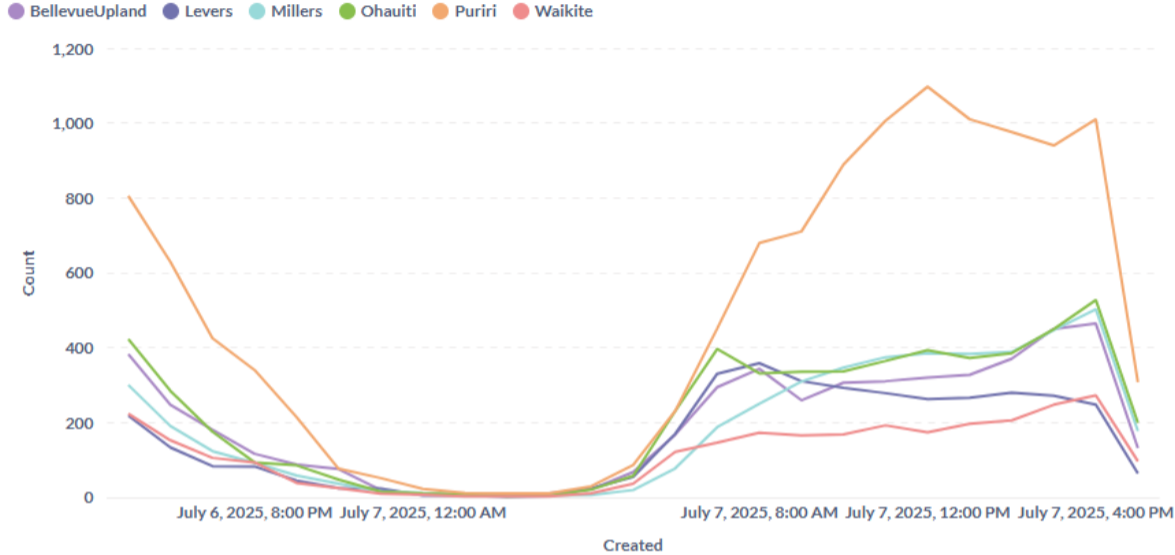
Speeders - May, Puriri



Speeders - May, Millers



Vehicle Traffic counts, current 24hrs



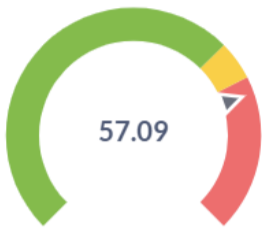
Levers - Max Speed 24 hours



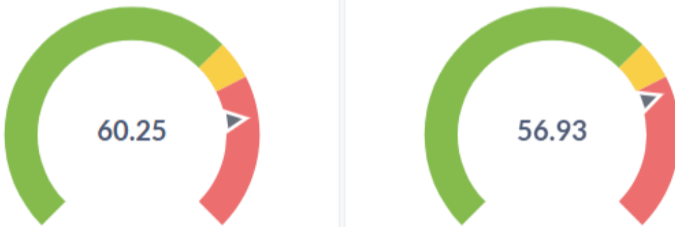
Millers - Max Speed 24 hours



Ohauiti - Max Speed 24 hours



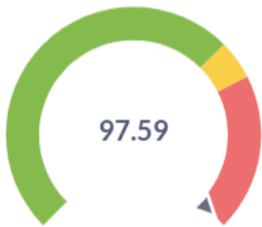
Puriri - Max Speed 24 hours



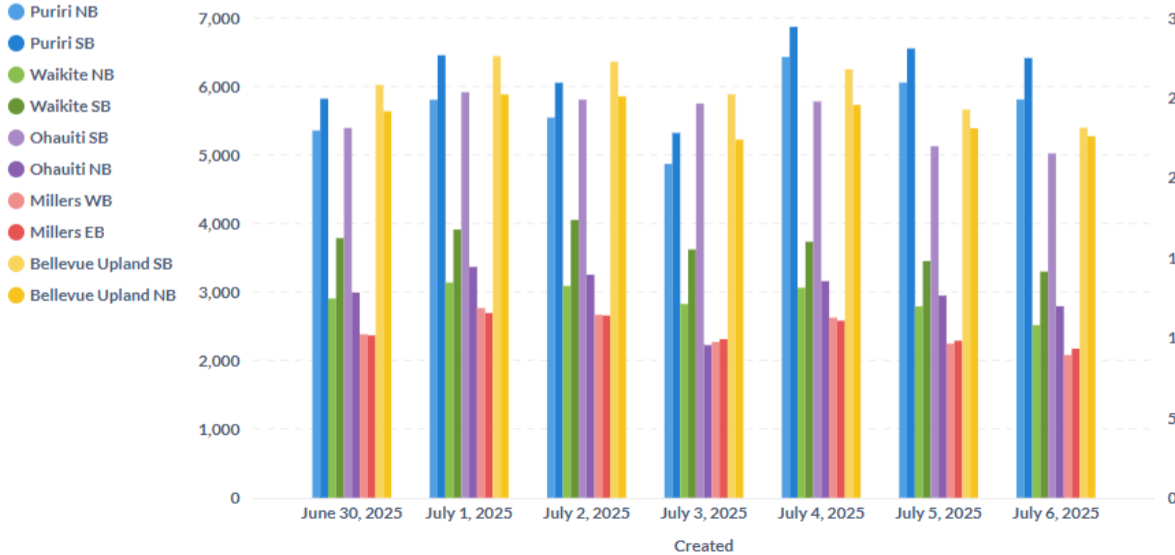
Waikite - Max Speed 24 hours



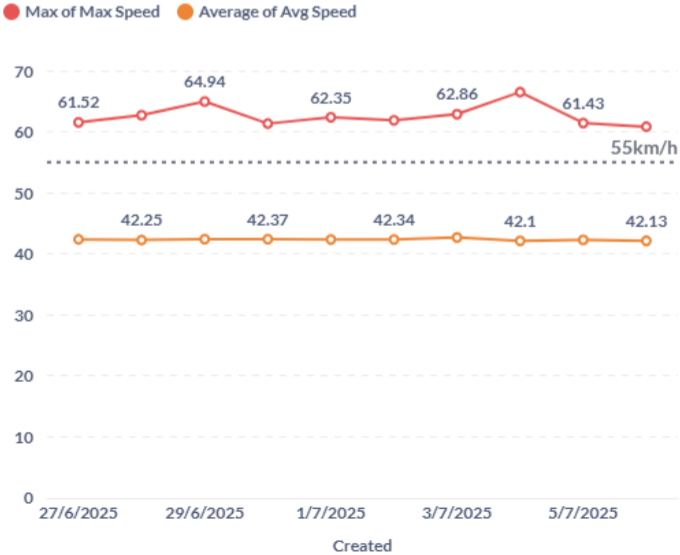
BellevueUpland - Max Speed 24 hours



Vehicle Traffic counts, previous 7 days



Axis - Speed reporting - 30 Days by Day - BU Excluded



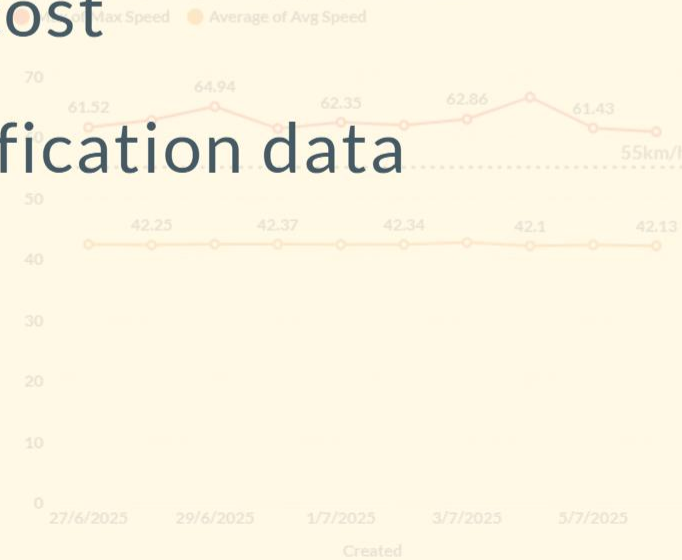
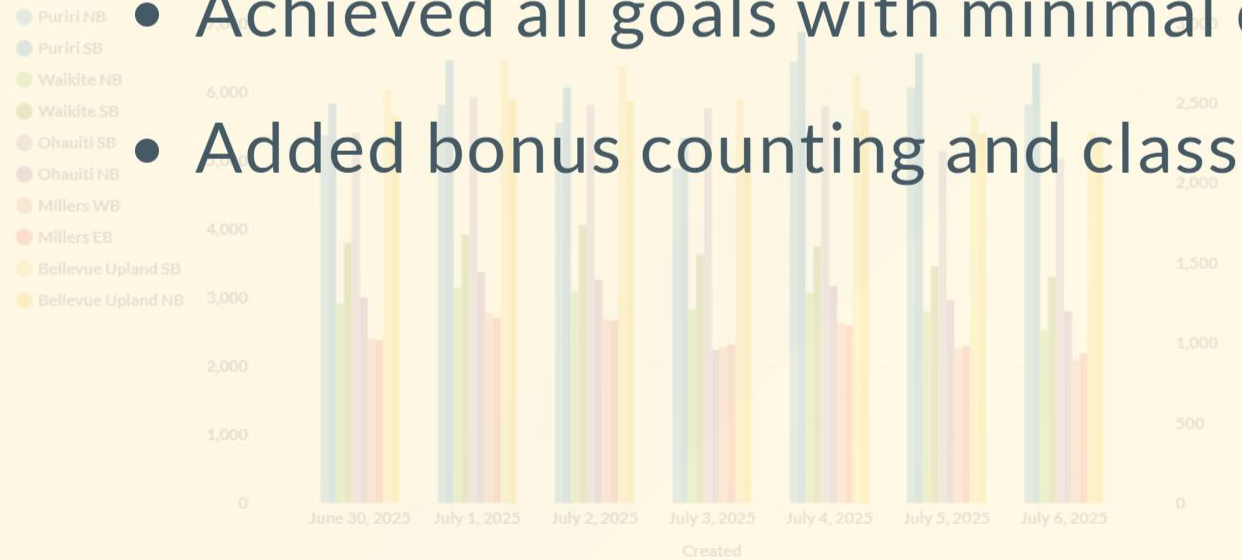
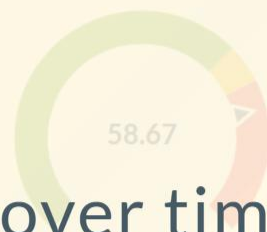
Probably Speeding, previous 7 days

Camera Name ^	^ Max	Direction ^	Timestamp ^
BellevueUpland	140.32	departing	July 1, 2025, 3:11
BellevueUpland	134.75	departing	July 4, 2025, 8:36
BellevueUpland	130.82	departing	July 5, 2025, 5:12
BellevueUpland	128.51	departing	July 4, 2025, 1:33
BellevueUpland	126.17	departing	July 4, 2025, 2:41
BellevueUpland	113.12	departing	July 2, 2025, 2:45
BellevueUpland	107.46	departing	July 4, 2025, 3:11
BellevueUpland	106.15	departing	June 30, 2025, 11:42
BellevueUpland	102.41	departing	July 3, 2025, 1:42

Rows 1-9 of 214 < >

Results

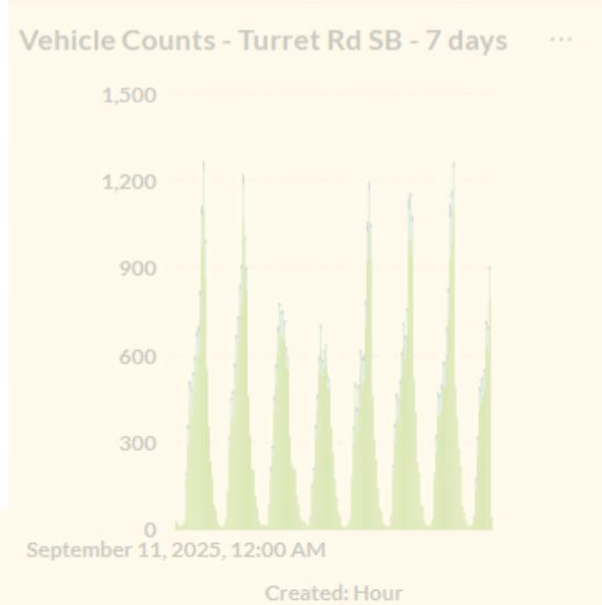
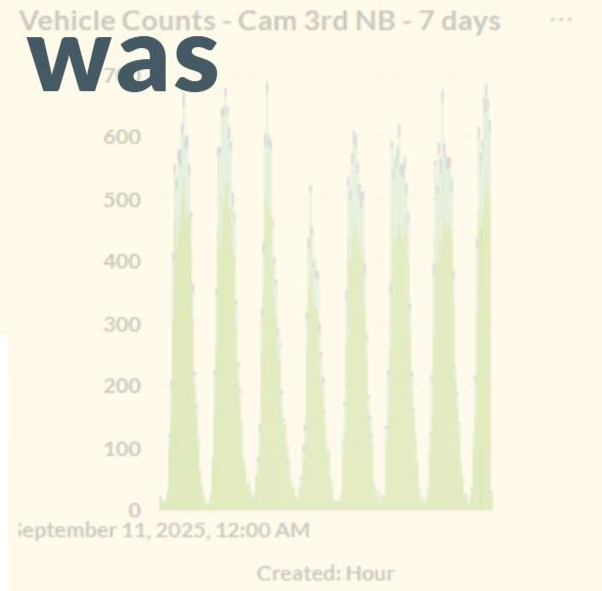
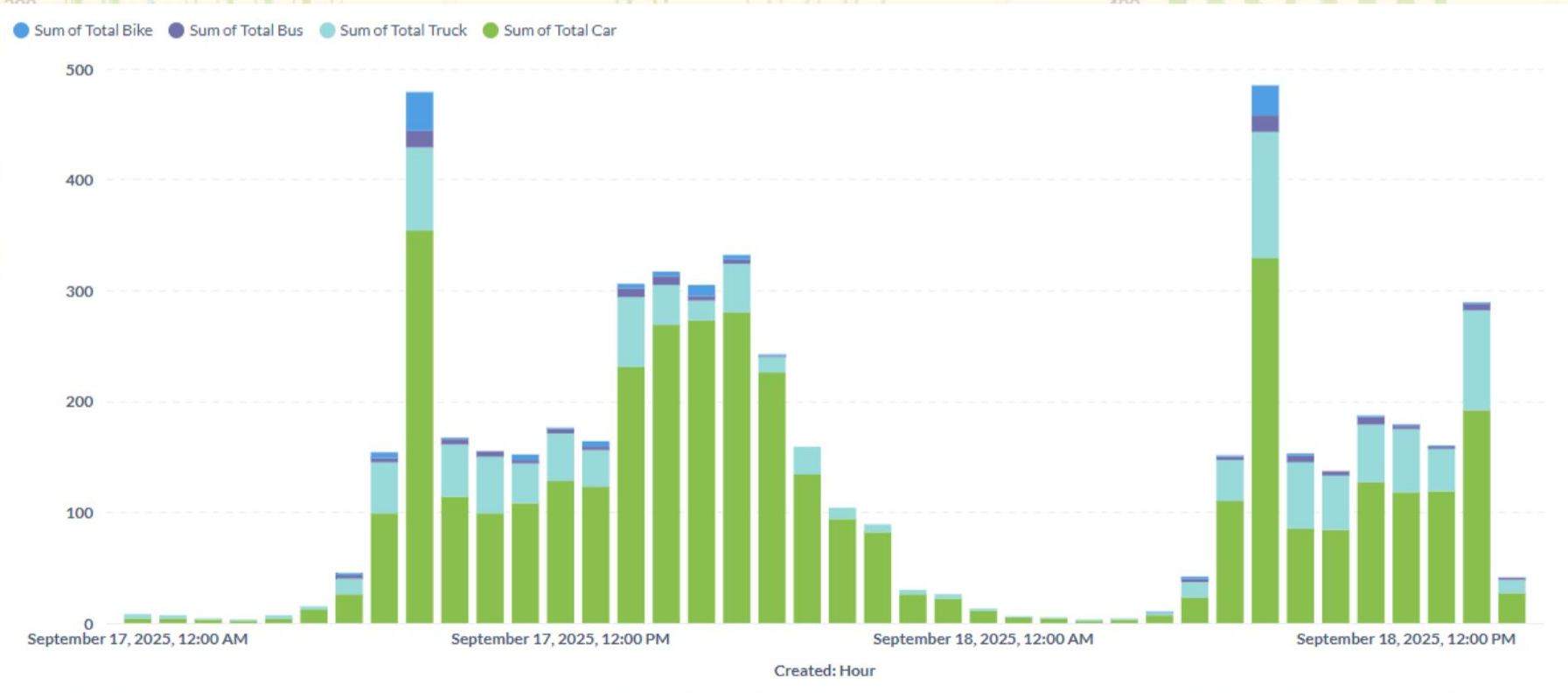
- # Results.
- Quantified vehicle speed patterns
 - Identified peak speeding hours and locations
 - Enabled evidence-based discussions



Lessons learned, future improvements

- Axis camera integration was very straight forward
- MQTT and Node-RED provides great flexibility
- Importance of data validation and filtering
- Counting and Classification was an immediate next step
- Open-source tools can be powerful but are they production-ready?
- Reports for excessive speeding
- Totally remote deployment using a NUC and Mobile networks

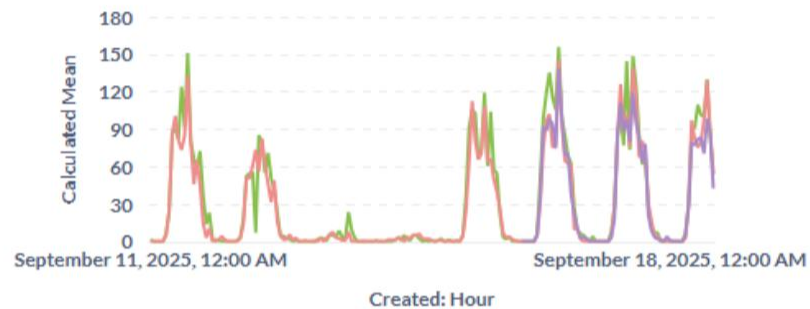
Update: Counting and Classification was indeed the next logical step...



And not just for roading...

90D Lift Usage - Previous 7 days

● Lift A usage ● Lift C usage ● Lift B usage



90D - Main Entry people counts

● 90D Entry Count ● 90D Exit Count

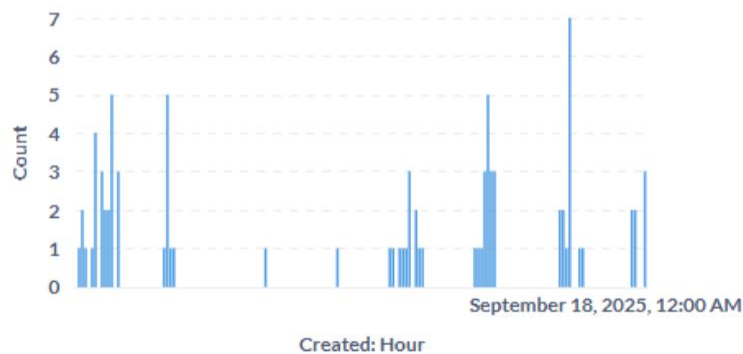


90D - Rear Entry people counts

● 90D Rear In ● 90D Rear Out



Tailgating Events, previous 7 days



90D - Side Entry people counts

● 90D Side In ● 90D Side Out



It's also good for monitoring...

41

Current runnin...

8

Realtime reads ...

28,812

Realtime reads per hour

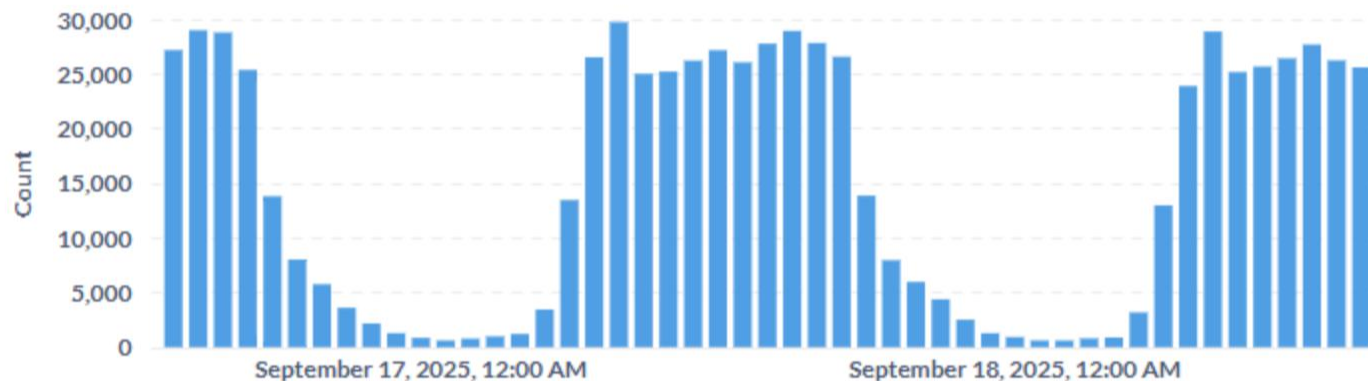
229.6k

Plates read today

5,371

Misreads today ...

Reads per hour - last 48 hours



Questions? Feedback?

Hopefully you've seen this running in the TTOC

Contact Info

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Tauranga City