

Next-Generation Traffic Signal Priority

for Emergency Vehicles and Buses

SNUG | Sept 2026 | John Kinghorn, Hamilton City Council

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Pressure for priority

- Elected members pushing for emergency vehicle priority
- Pedestrian safety at signals
- Increasing focus on Bus reliability



WAIKATO TIMES

Red light, green light: Hamilton fire trucks first in NZ for traffic light tech

Andrew Ashton | WAIKATO TIMES

June 22, 2026 Comment (0) Share



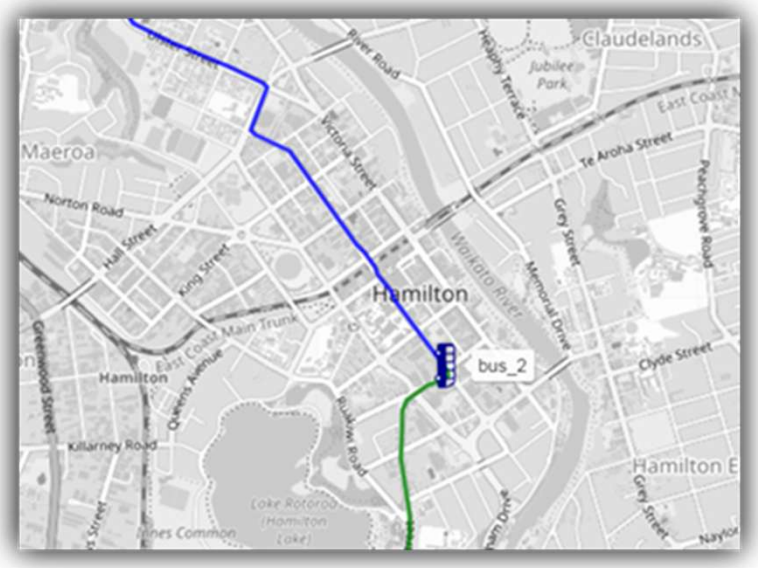
Senior firefighter Jay Culhane is welcoming new technology that will turn traffic lights green for fire trucks as they approach.
CHRISTEL YARDLEY / WAIKATO TIMES

Fire trucks in Hamilton will be the first in New Zealand to use satellite technology to turn traffic lights green on demand.

Hamilton Senior Fire-fighter and driver Jay Culhane said the technology would be a "major benefit" for crews responding anywhere in the city with multiple intersections.

Where NZ is today

- Citywide signal priority is rare in NZ — expensive and political
- Hamilton has some basics:
  - Fire station door green wave
  - Bus priority through custom SCATS interface
- But nothing city-wide or smart





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Our objectives:

- Priority across the whole city
- Buses, fire trucks and other emergency vehicles
- Affordable
- Easy to adjust level of priority/impact



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What's on the market?

There are two main options:

Option 1: Buy a commercial system

Expensive licensing
Not very customisable
Limited interfacing with SCATS

Option 2: Custom Broker

Native SCATS interface (SPE)
Still expensive
Need to build own broker

Neither quite met our objectives.

So, as Hamilton often does when we can't find what we want… we build it!

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TDAP – adaptable traffic signal priority

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At its core, you need three components

Live vehicle data

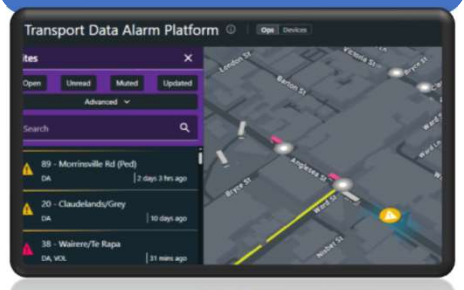
Bus feeds we had

Fire data from Fire & Emergency NZ



Smarts (priority engine)

Configurable decision logic



SCATS interface (read and write)

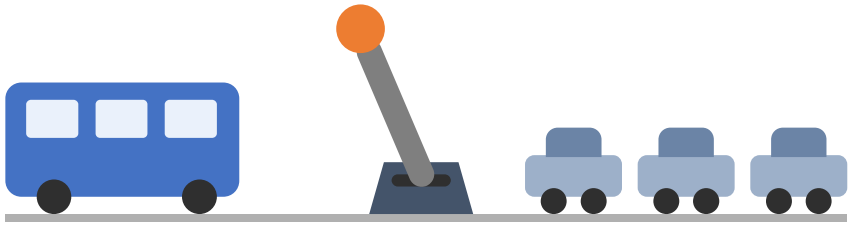
Smarter decisions by understanding current state and traffic conditions

scats™

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Priority Engine – key objectives:

- **Minimise impact** to current operation
  (Interrupting signals can be problematic, we have seen this happen overseas)
- **Configurable trade-off** between general traffic and priority vehicles
- **Easy** to set up, nice user interface
- **Clear data**, watch it live, play it back, know the impact



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Doing priority smarter…

Time to arrival
Priority based on when the vehicle will actually arrive — not fixed zones like market systems

Sequence aware
Consider the current SCATS plan, determine how to give priority with the least impact

Configurable aggressiveness
Dial priority up or down — how much disruption are we willing to cause
Set by site, vehicle type, route, etc…

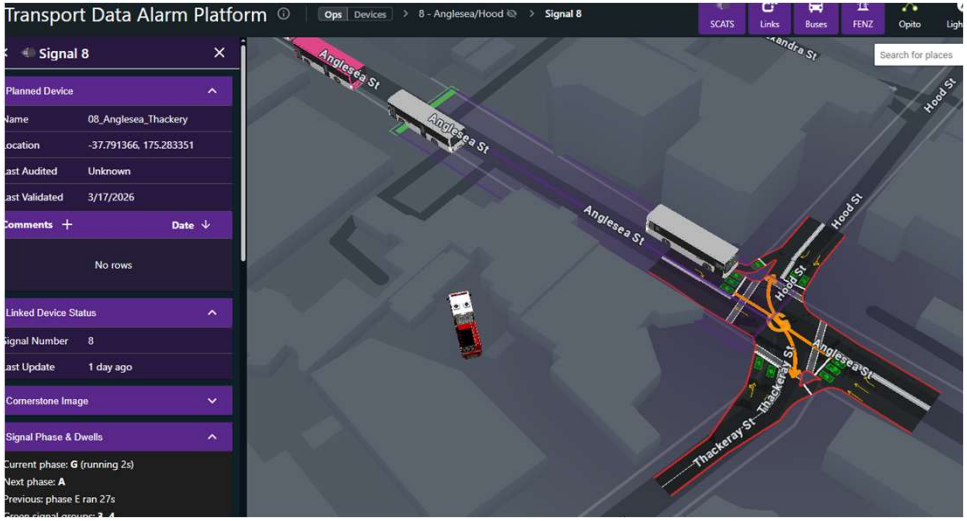
Measure the impact
Monitors the intersection and adjusts — no recovery needed if the impact was minimal

… and many more!

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Where we're at

- Cloud-based, easy to deploy
- Mostly auto-config using information from SCATS
- It's been running live for the last few months trialling bus priority
- Fire truck priority trial just starting
- Currently collaborating with
  - **FENZ** (improving real-time feed quality)
  - **POLICE** (potential trial for police vehicles)
  - **NTS** (assessing future state real-time feed)
  - **SCATS** (licencing / comparison with SPE)



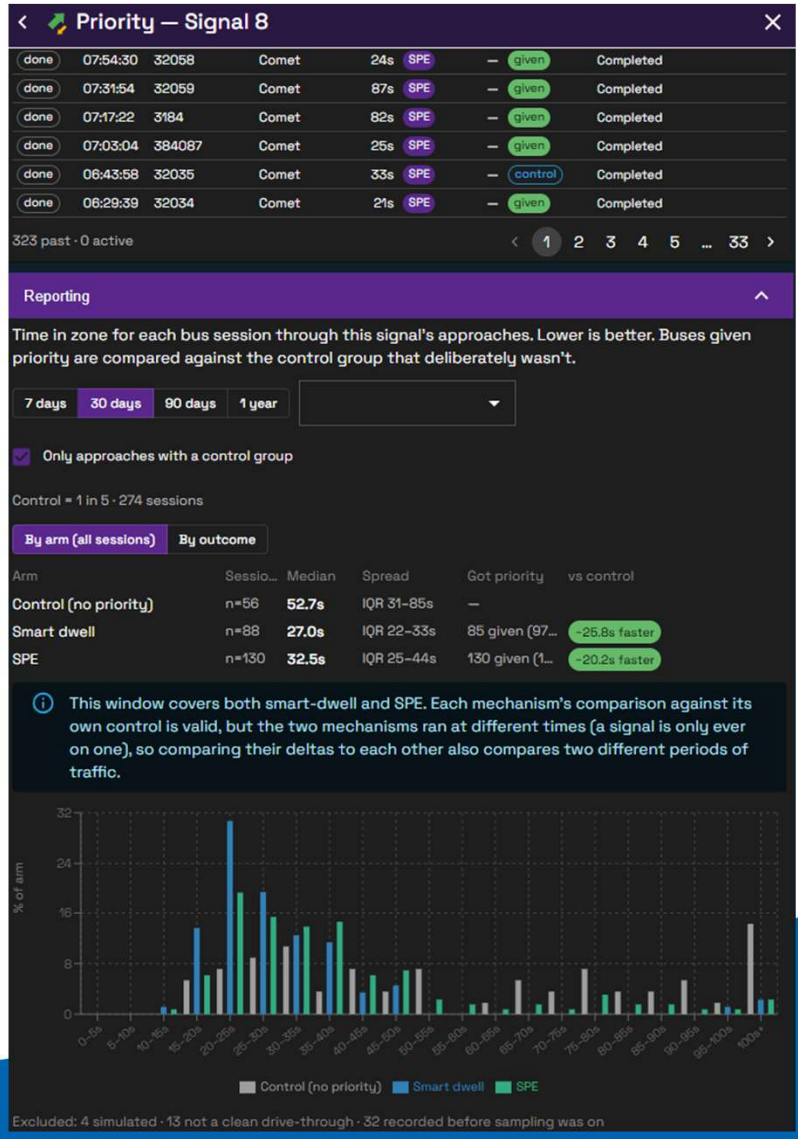


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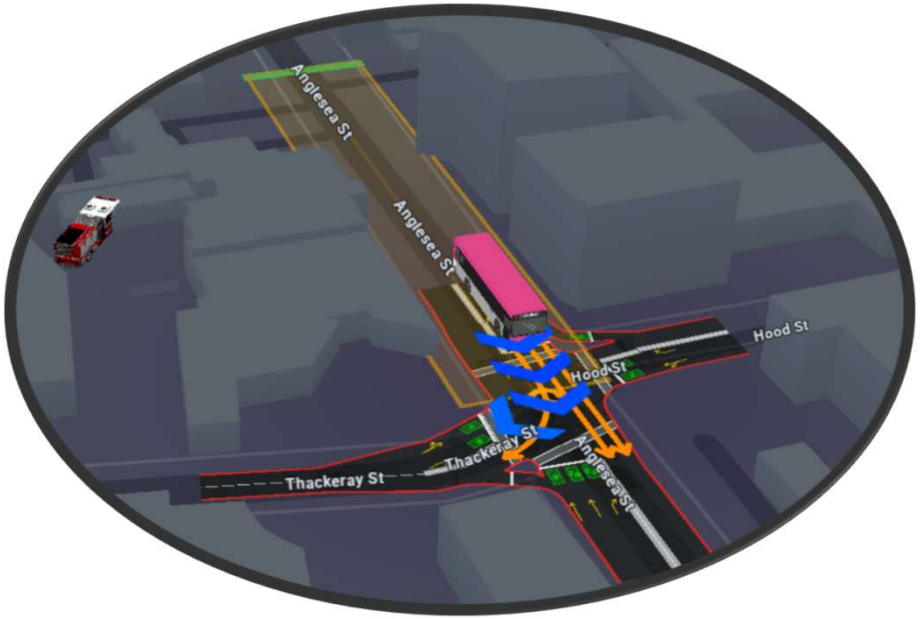
Results and learnings

- Buses: Improves reliability and schedule adherence. Typical average saving is 5-25s per site
  - Bus stop location has big impact. Should be just downstream (not upstream) of signals
- Fire: Clears queues and avoids peds crossing
- Able to minimise impact to SCATS by:
  - Dynamic cooldown based on impact to plan
  - Consider if site is Married / Master Isolated / high CL
  - Running in the diamond phase (SG depending)
- GPS quality (frequency and latency) is key
  - Fire trucks needed new GPS devices
  - NTS frequency and latency halves the benefit



What's next for TDAP Priority?

- More features ☺
- Network-wide reporting dashboard (including impact on general traffic)
- Deployment for other Road Controlling Authorities to trial
- Continued colab with SCATS/Police/FENZ/NTS
- Auto-config for Fire priority (citywide)
  - I'd love to see NZ wide fire priority for the safety benefit



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Questions?

Thank you

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