secure agility

City on the move

How movement IoT and edge computing combine to optimise Sydney's cycleway and taxi flow

Success for Transport for NSW with Secure Agility

Sydney's expansive network of cycleways and taxi ranks is frequently contested between pedestrians, cyclists and public transport vehicles.

To enable more commuter choice and a safer environment for commuters and drivers, Transport for NSW is at the forefront of using technology for public transport management and commuters are set to get even more options for trip planning via digital channels.

Safety and a return on investment for dedicated cycleways and taxi ranks the big winners with an innovative approach to movement driven IoT sensors and edge computing.

The challenges of transport planning and safety

With hundreds of thousands of people commuting each day across Sydney alone, authorities have a huge task to ensure dedicated spaces are available for different modes of transport, while ensuring journeys are as safe as possible.

Ensuring optimal transport management – including people and vehicle movement, crossings for cyclists and pedestrians, road space allocation and environment optimisation – requires the right type of data to influence decision making, which, if solely dependent on human resources or cumbersome methods such as road tubes, would not scale.

Digitising for scale

Sandeep Mathur of Transport for NSW, said with new investments in cycleways and taxi ranks, there was a good opportunity to digitise how these spaces are managed.

"With the help of IoT and sensor technology, we can gather data and insights at a scale not possible with manual supervision," Mathur said. Charlie Tannous, Director of Technology at Secure Agility, said Transport for NSW was not just innovating with transport management, but with the limits of what is possible with movement driven IoT solutions.

"When people think of IoT they think of getting data from devices which were always analogue, or not even measurable," Tannous said. "Movement-driven IoT is an exciting advancement that uncovers data in response to visual events, not just time or thresholds."

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Sandeep Mathur, Director, Active Transport Portfolio Data & Analytics, Transport for NSW

Video + edge computing combine for movement driven IoT

With traditional video monitoring not sufficient to provide the insights required of its dedicated transport spaces, Transport for NSW partnered with Secure Agility to develop an innovative movement driven IoT solution.

This provides Transport for NSW the exact data it needs without overwhelming volumes of recordings, or teams of manual inspectors

Smart Edged & Hardened

Secure Agility explored and engineered an IoT solution with a weather hardened 'smart edge' computer vision system integrating Cisco equipment.

The smart edge consists of one Cisco Meraki camera, a Cisco IR 1101 router (with 4G connectivity), and one small form-factor computer (with GPU) running the custom AI edge application.

Edge application receives the live footage stream from the camera and the AI application analyses it based on the use case, such as cycleways and taxi ranks, and exports an anonymous stream of data into the Transport for NSW environment. "Our smart edge solution provides an API to Transport for NSW and also feeds data into its open data hub for a visual dashboard prepared by the internal team," Tannous said. "However, we have the option for more custom dashboards ongoing."
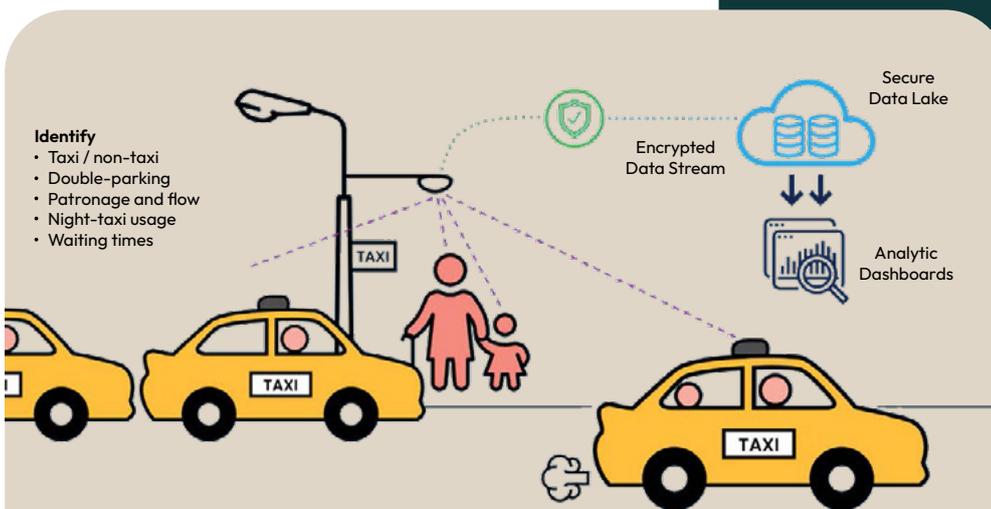
Privacy is embedded

The security of public recordings is paramount, and these are embedded into Secure Agility's solution. The cameras do not record or stream footage unless required by Transport for NSW and the edge application itself does not store any footage, it only sends encrypted data into the Transport for NSW data lake in the appropriate format. If recording or streaming is required, all footage is encrypted at rest and in transit, with all access governed by strict role-based access controls. Faces and other sensitive data, such as number plates, can be obfuscated prior to storage.

"Movement-driven IoT is an exciting advancement that uncovers data in response to visual events, not just time or thresholds."

Charlie Tannous, Secure Agility

Identify
- Taxi / non-taxi
- Double-parking
- Patronage and flow
- Night-taxi usage
- Waiting times

Encrypted Data Stream

Secure Data Lake

Analytic Dashboards

## Visibility, insights start new era in transport management

With sites in production, Transport for NSW now has a smart edge platform for transport management which takes field data and uses it to create visualisations as required to address multiple use cases.

Move IoT goes beyond just generating data using AI. It allows for customised workflows tailored to the customer's data requirements.

At Transport for NSW, the solution provides local councils with data and analytics into cycleway behaviour that can be used to ensure cycleways are safe and optimised. Bicycle, car and pedestrian movements are all captured in all weather and conditions to provide a full, 24-by-7 view of the environment, to allow better planning of cycleway infrastructure.

Train to new use cases

The solution can be easily installed on poles across cycleways and busy intersections, providing an instant analytical data stream. Being edge-based – not just for image processing but also for data analytics and logic generation – reduces cloud central compute resources and exploiting low-cost and low-power on the edge. Cycleways and taxi ranks generate quite different data, but
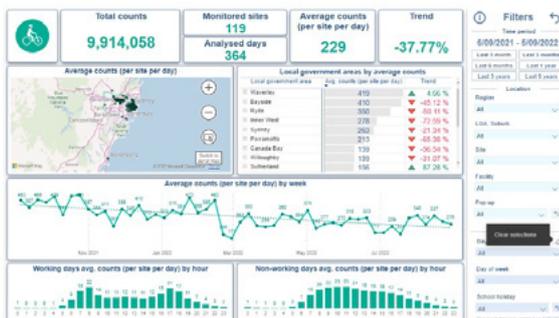
Move IoT is unique because the data is visualised in customer dashboards that are portrayed in both cycling and pedestrian counts and are on display to the public.

Case Study Summary

Customer: Transport for NSW

Challenge: Efficiency and compliance of dedicated transport spaces

Approach: Move IoT. New movement based IoT and edge computing system with AI video processing

Outcomes: Automated monitoring and alerting of use and compliance for any transport space

Partners: Secure Agility, Cisco

the edge computing platform can handle the data for multiple use cases, which is another innovative use of IoT. This 'platform elasticity' can be adapted to limitless use cases without needing to be re-coded.

"From a planning perspective, there does not need to be any more guesswork," Tannous said. "With our movement-based IoT solution, transport planners can see exactly what is going on and get alerted."

Edge computing also makes the system more efficient. Sending all the footage to central location would be time and cost prohibitive, therefore only metadata gets sent to the cloud. Optimised to run on minimal mobile network coverage, Move IoT saves costs, increases reliability, and provides a high degree of location flexibility.

"We have very good collaboration between Secure Agility, Cisco and our Lighthouse Innovation & Active Transport teams. Secure Agility is like an extension of my team."

Sandeep Mathur, Director, Active Transport Portfolio Data & Analytics, Transport for NSW

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