Loading Zone Monitoring - Helsinki

Funded by the European Union

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Loading Zone Monitoring - Technolution

Location: Helsinki City, Finland
Target users: Traffic and logistics engineers, traffic consultants and commercial vehicle drivers
Company: Technolution AB
Partners: no partners

- **The objective was to test and evaluate new methods in collecting and analyzing data related to the usage of logistics loading zones in downtown Helsinki. Real-time occupancy of loading zones was also provided to commercial drivers via Tietorahti smartphone app**

- **Technolution FlowCube AI sensors were deployed in three (3) different locations to collect insights how loading zones were used (occupancy, vehicle class, stay duration) and real-time information was send via Tietorahti map server to commercial vehicle drivers using Tietorahti smartphone app**

- **Based on the implementation, the FlowCube AI camera sensor is well-suited for monitoring loading area usage and provides versatile insights to traffic planners and logistics planners. In addition, portable, battery-operated data collection solution was also developed, enabling approximately 8 - 10 days of measurements on a single charge.**

Content

1. Goal(s) of the measure

As part of the DISCO project, the goal of the implementation was to test new methods for collecting and analyzing data on logistics loading zones and their usage in downtown Helsinki. The objective of the measure was to generate data on occupancy of vehicles using the loading zones, parking durations and vehicle types, which could then be used by the City planners to support the development of loading zones planning.

During the experiment, real-time information on the status of the loading zones was provided to Tietorahti map service and the occupancy information was visualized in the Tietorahti mobile app used by commercial drivers.

Another key objective of the experiment was to design and validate a portable, stand-alone data collection system powered by an independent energy source. As part of the measure, the performance and durability of AMG batteries were systematically tested and evaluated.

For Technolution, the primary objective of this implementation was to advance the development and validation of the FlowCube sensor's AI algorithms and backend infrastructure. Specifically, Technolution aimed to enhance the system's ability to accurately detect vehicle occupancy and measure parking duration in street-level environments, while enabling the data to be visualized in a structured and easily interpretable format.

DISC

Technolution FlowCube AI camera sensor

Technolution’s portable stand-alone battery foundation with telescopic pole structure

2. Description of the solution

The measure was based on Technolution's FlowCube AI camera sensor, which can identify and classify various objects such as passenger cars, vans, buses, trucks, pedestrians, bicycles and e-scooters.

During the implementation the following HW & SW solutions were developed and tested:

1. Portable stand-alone battery foundation with telescopic pole structure. The AGM battery operated stand-alone FlowCube AI sensor works between 8...10 days on a single charge.

2. The FlowCube AI sensor's artificial intelligence was trained to detect vehicles that had stopped in designated loading zones (occupancy detection). In addition to measuring the duration of occupancy, the system leveraged existing object classification functionality to identify and categorize the stopped vehicles

3. Using the OpenSearch Dashboards solution, Technolution developed various dashboard views through which loading zone occupancy data can be retrieved and examined by traffic engineers and logistics planners.

4. We also developed an interface between the Technolution´s DataExchange cloud and the Tietorahti Map service cloud to enable real-time exchange of loading zone occupancy data (available/occupied).

Description of the system

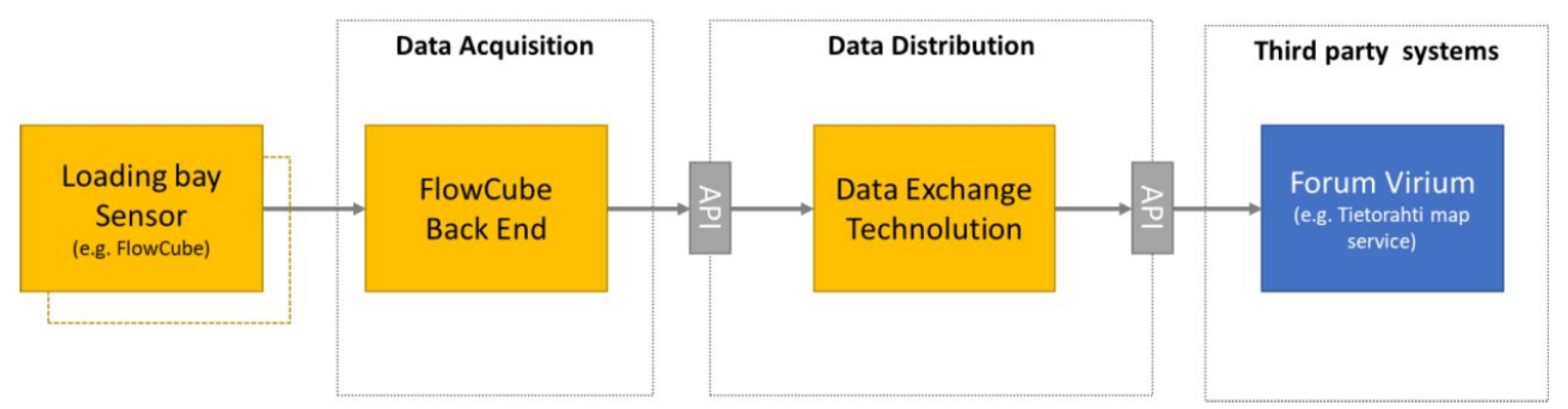


Figure 1: Technolution data broker / Data acquisition and distribution

Description of the system

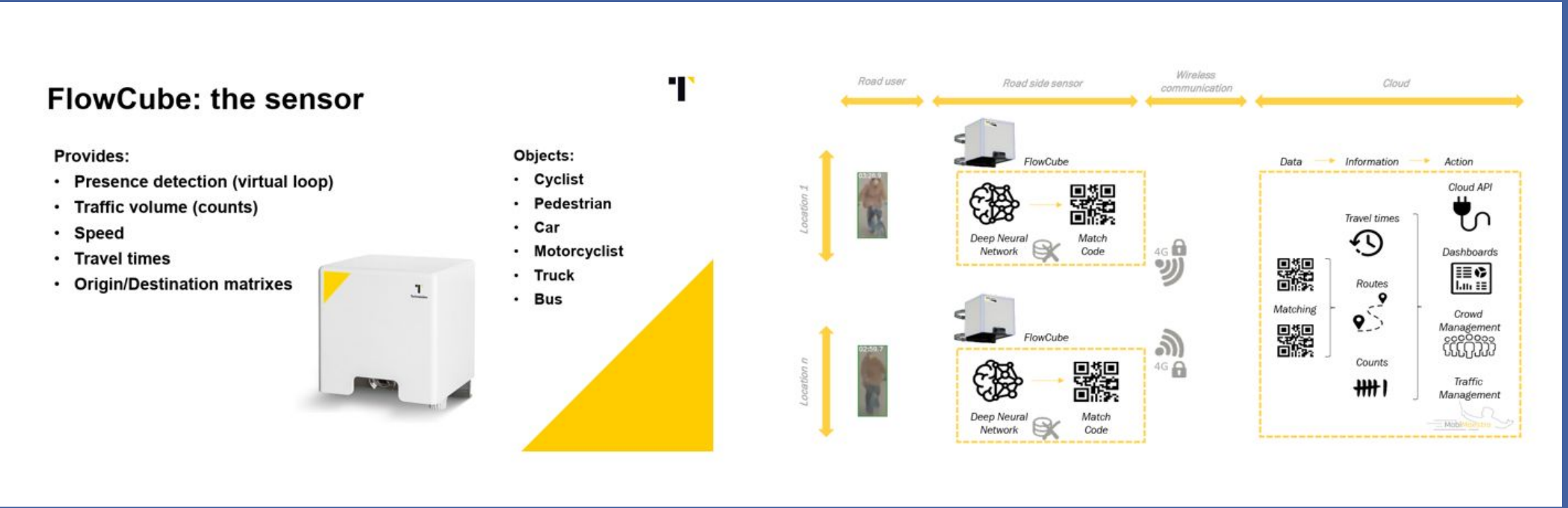
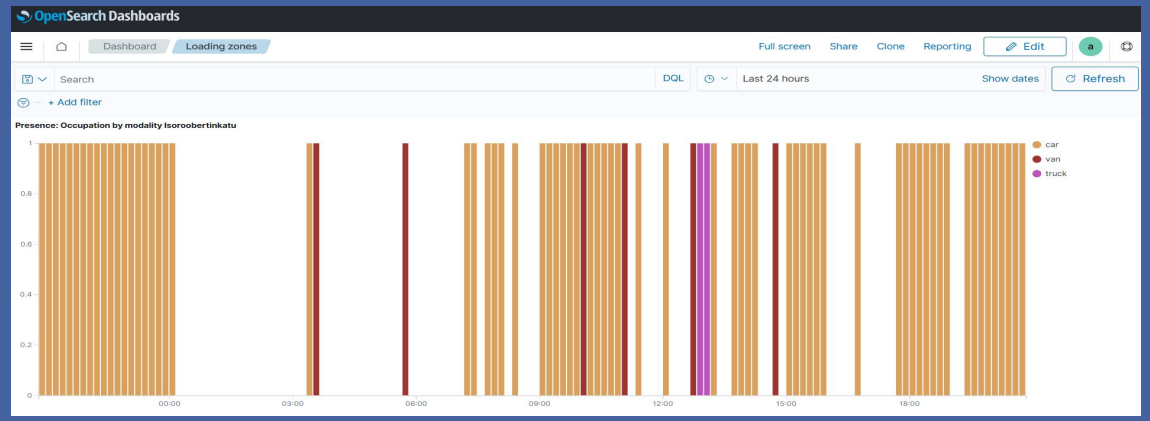


Figure 2: FlowCube, the sensor and how it works

Description of the system

Figure 3. Technolution’s ortable stand-alone battery foundation with telescopic pole structure

Description of the system



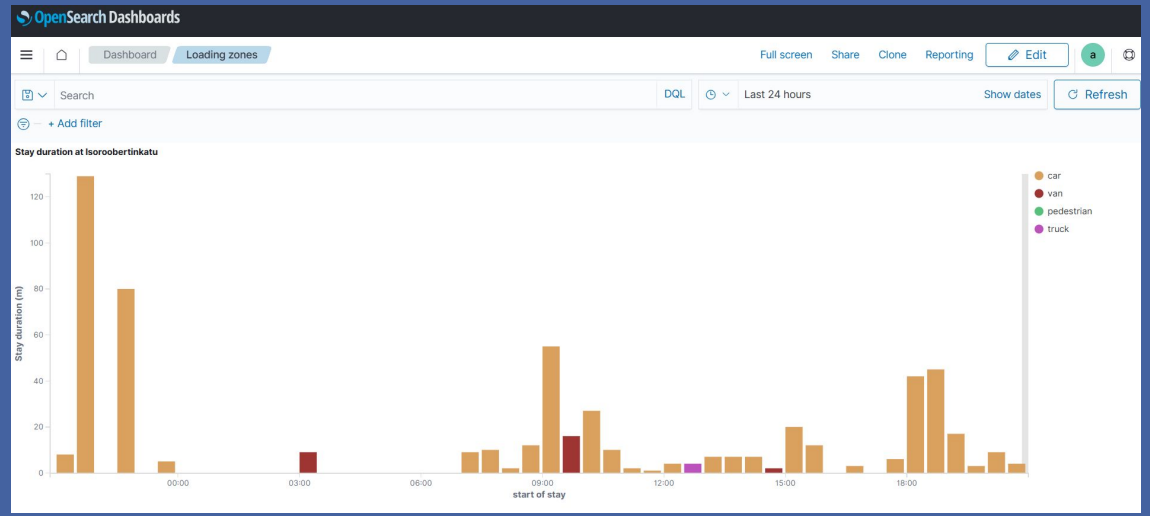


Figure 4. Technolution's installation photo (location: Annankatu 3) and examples of occupancy reports

3. Implementation

- Technolution FlowCube AI sensors were deployed in three (3) different locations to collect insights how loading zones were used (occupancy, vehicle class, stay duration)
- Two (2) FlowCube sensors were used in the implementation phase: one was installed and connected to mains power, while the other FlowCube sensor was a portable, stand-alone battery operated model that was relocated once during the implementation period.
- Data was sent to backend system and OpenSearch Dashboards was used to visualize loading zone occupancy data as well as the traffic counts
- Real-time occupancy data was also send via Tietorahti map server to commercial vehicle drivers using Tietorahti smartphone app
- All in all, the system operated reliably, and versatile data on the use of loading sites was successfully collected 24/7 over several weeks.

FlowCube AI sensor installation sites in Helsinki downtown

No 1. Vuorikatu 18

No 2. Fredrikinkatu 61

No 3. Annankatu 3

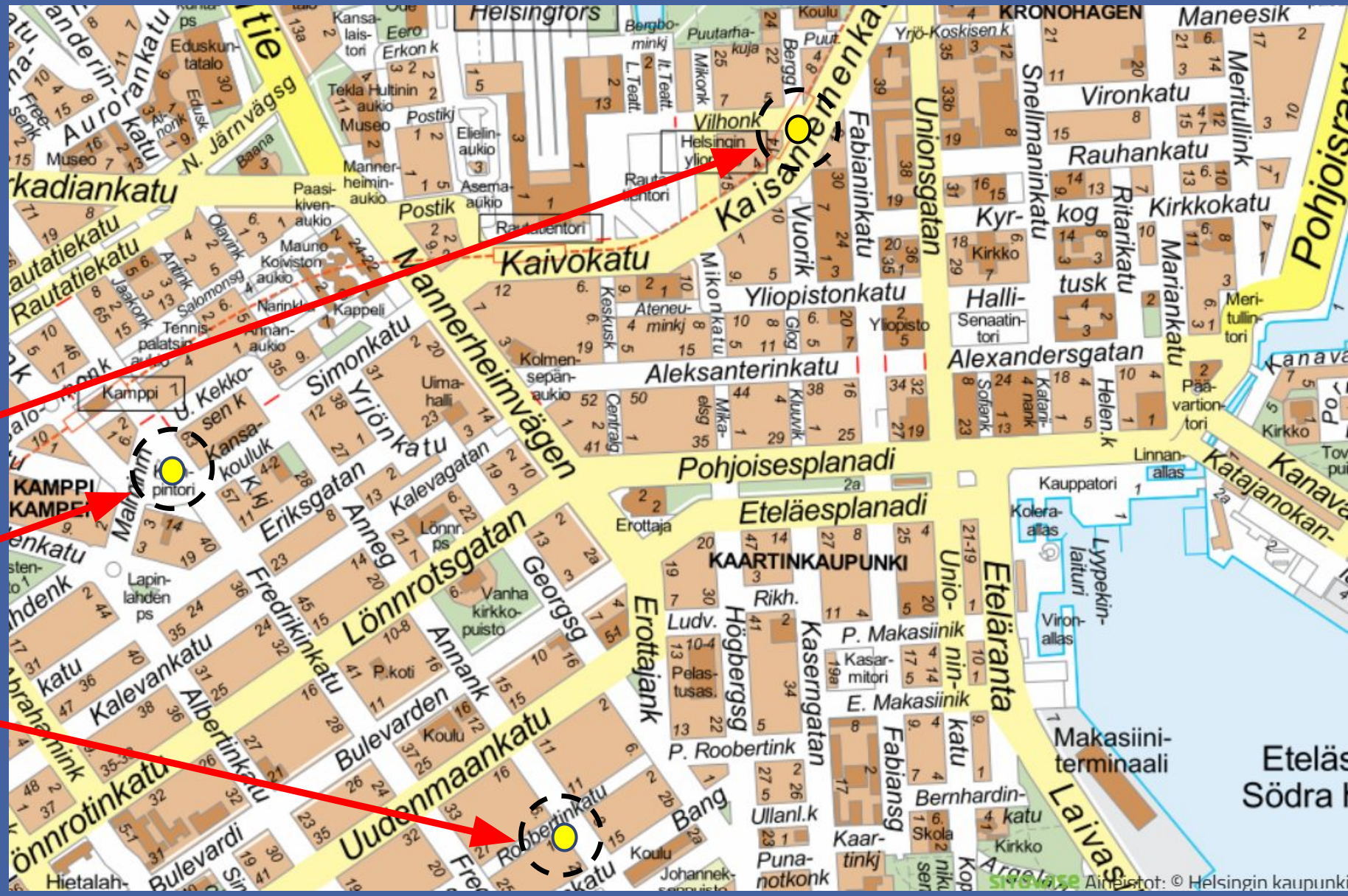


Figure 5: Helsinki downtown area, FlowCube installation sites

Installation site No.1

Address: Vuorikatu 18

Figure 6. FlowCube installation photos, Vuorikatu 18

Installation site No.1

Address: Vuorikatu 18

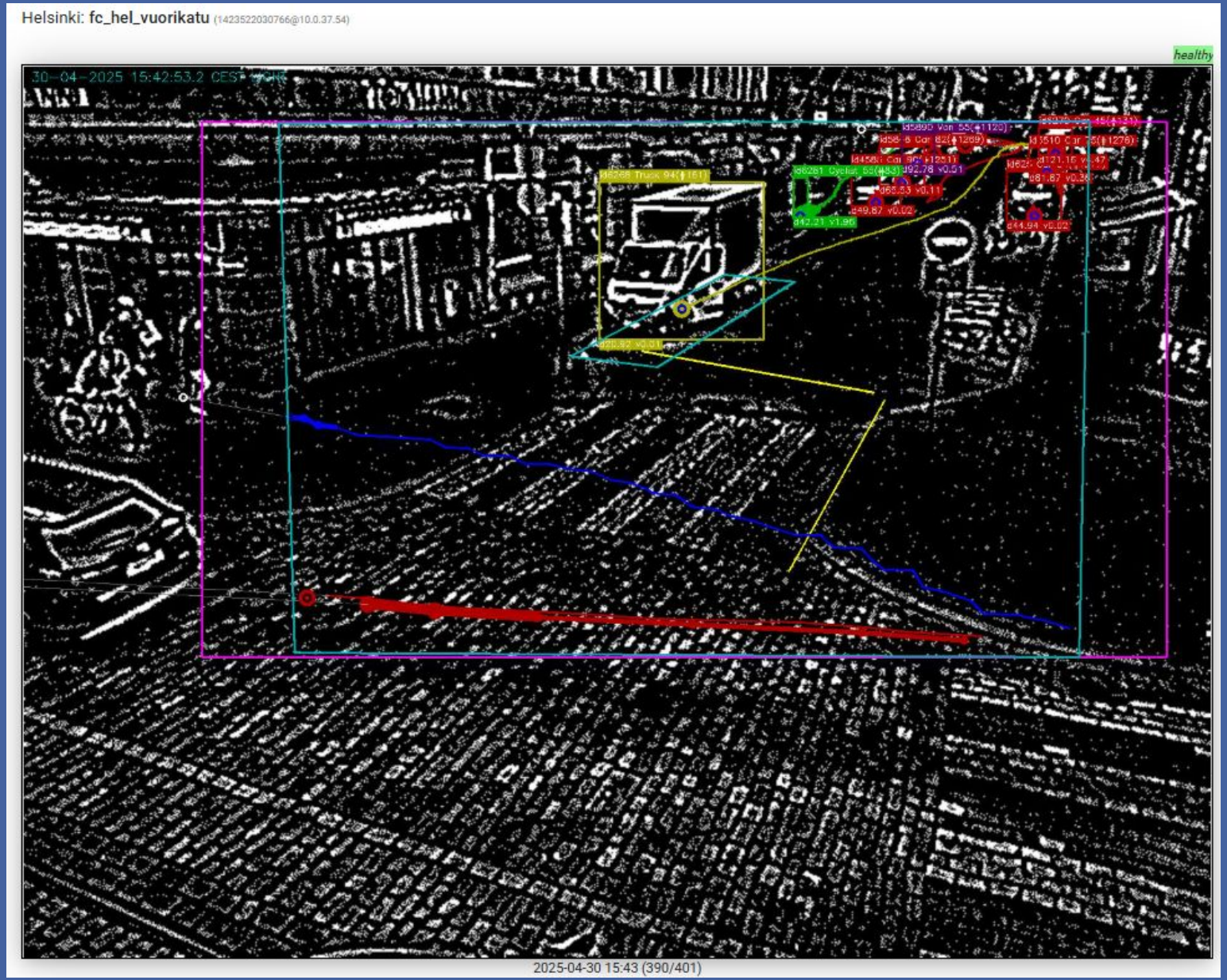


Figure 7. FlowCube blurred snapshot view, Vuorikatu 18

Installation site No.2

Address: Fredrikinkatu 61

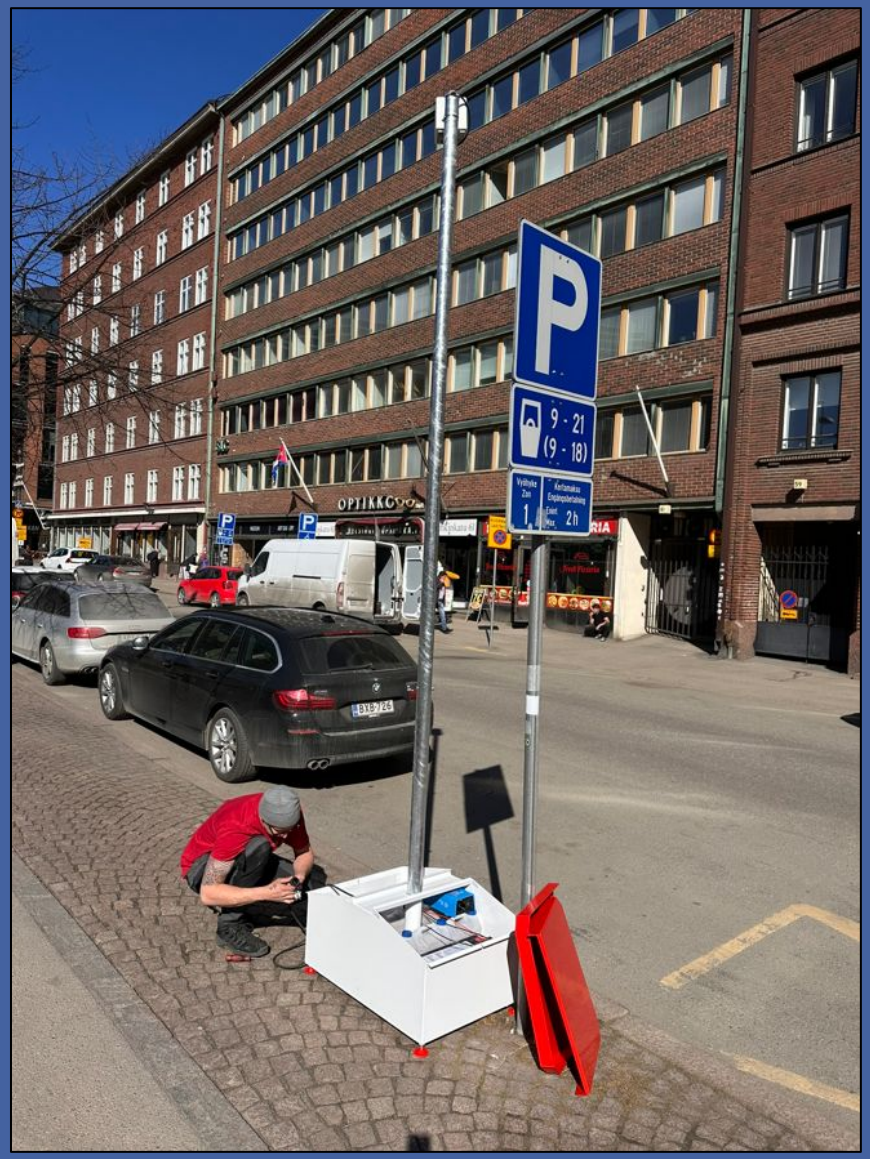


Figure 8. FlowCube installation photos, Fredrikinkatu 61

Installation site No.2

Address: Fredrikinkatu 61

Figure 9. FlowCube blurred snapshot view, Fredrikinkatu 61

Installation site No.3

Address: Annankatu 3

Figure 10. FlowCube installation photos, Annankatu 3

Installation site No.3

Address: Annankatu 3

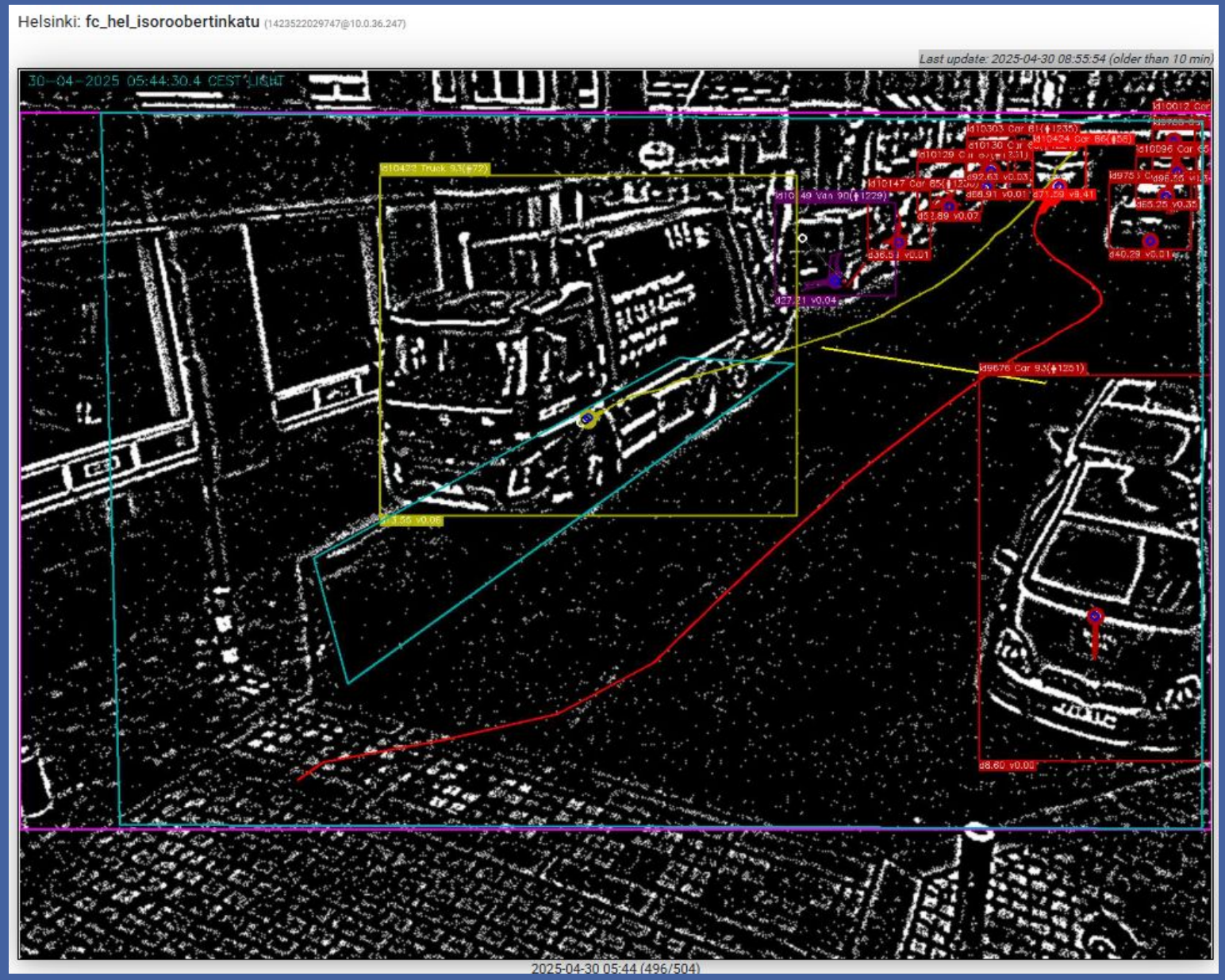


Figure 11. FlowCube blurred snapshot view, Annankatu 3

Tietorahti App view

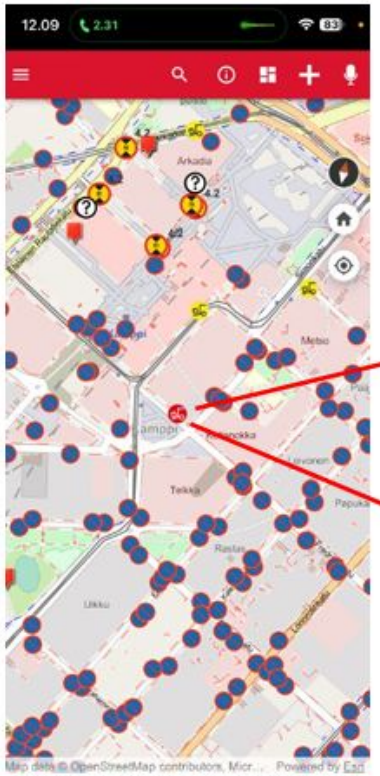


Figure 12. Tietorahti mobile app provides a real-time view of loading zone occupancy

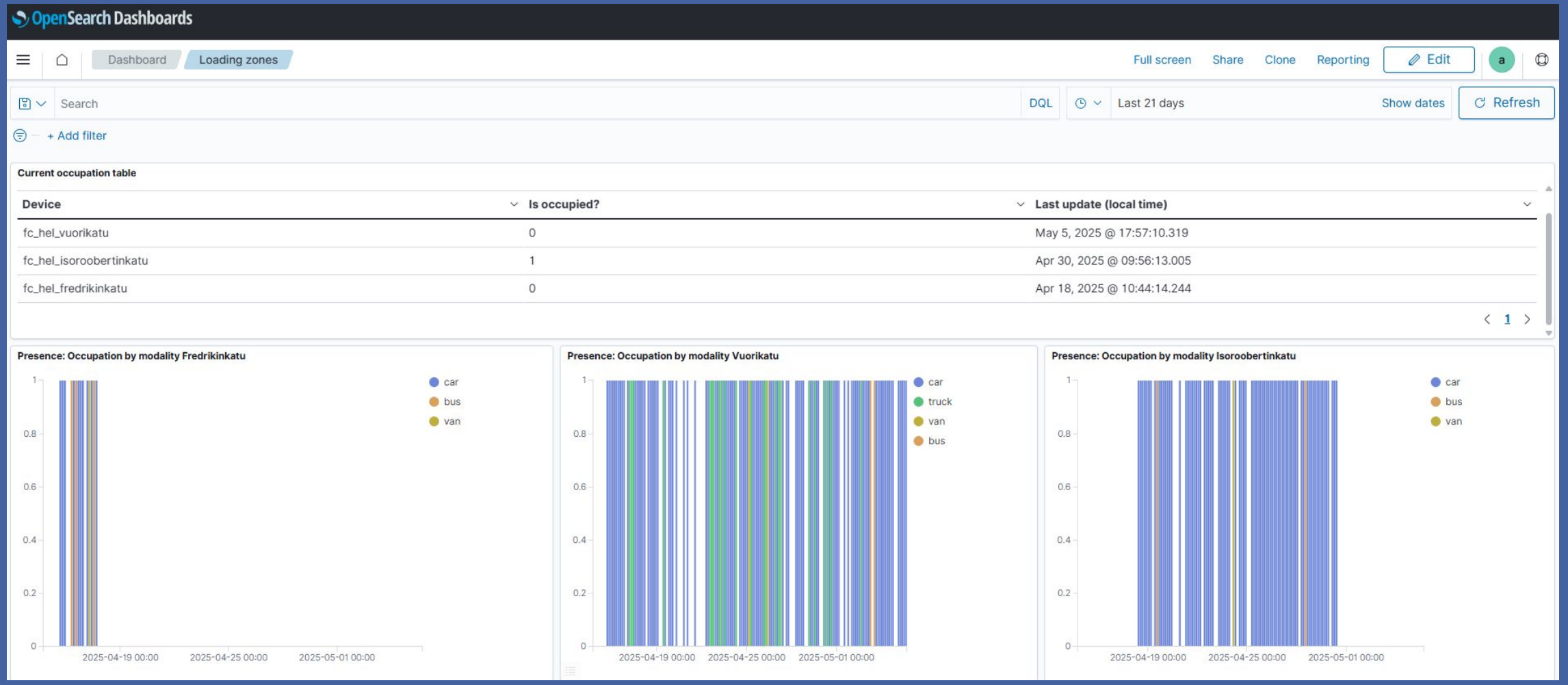


Figure 13. Home view of the OpenSearch Dashboards user interface

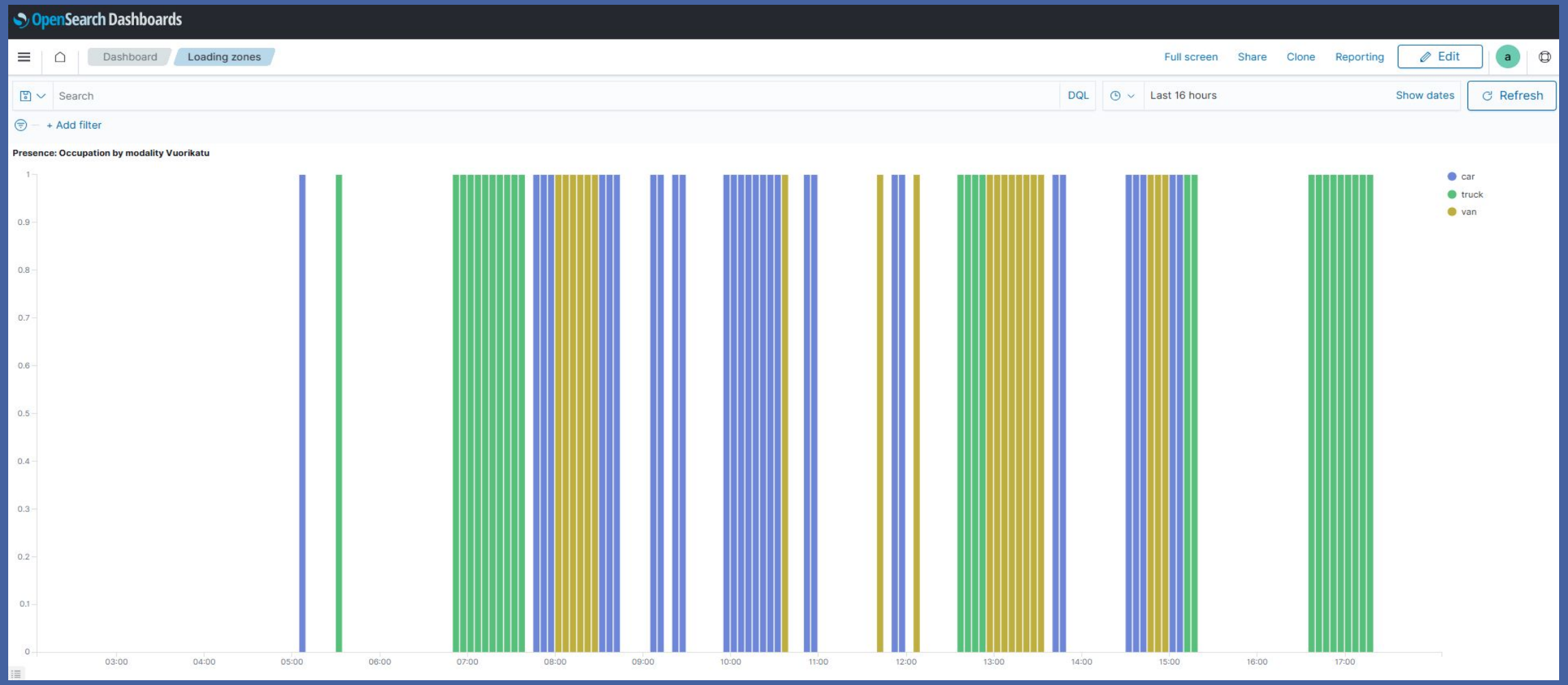


Figure 14. Occupation by modality view (Vuorikatu 18)

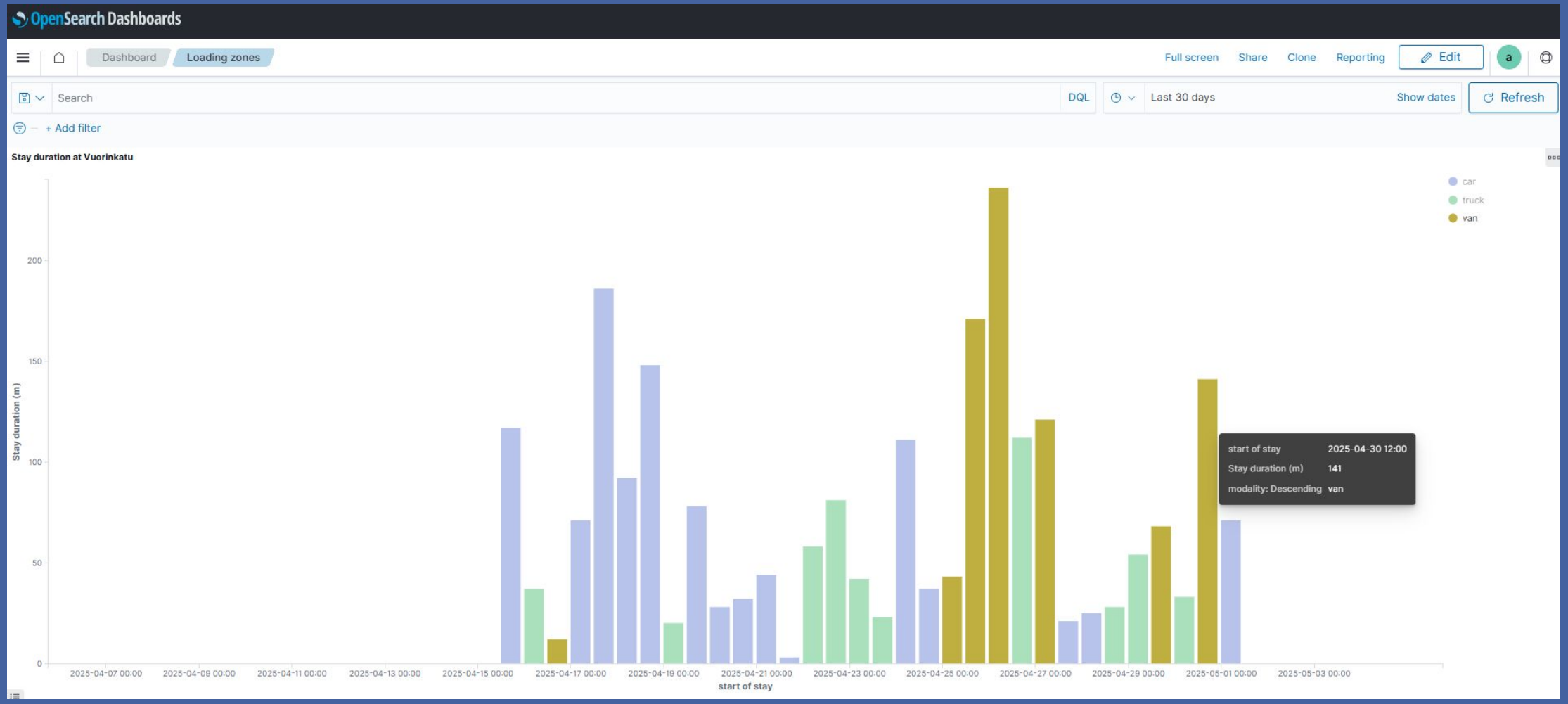
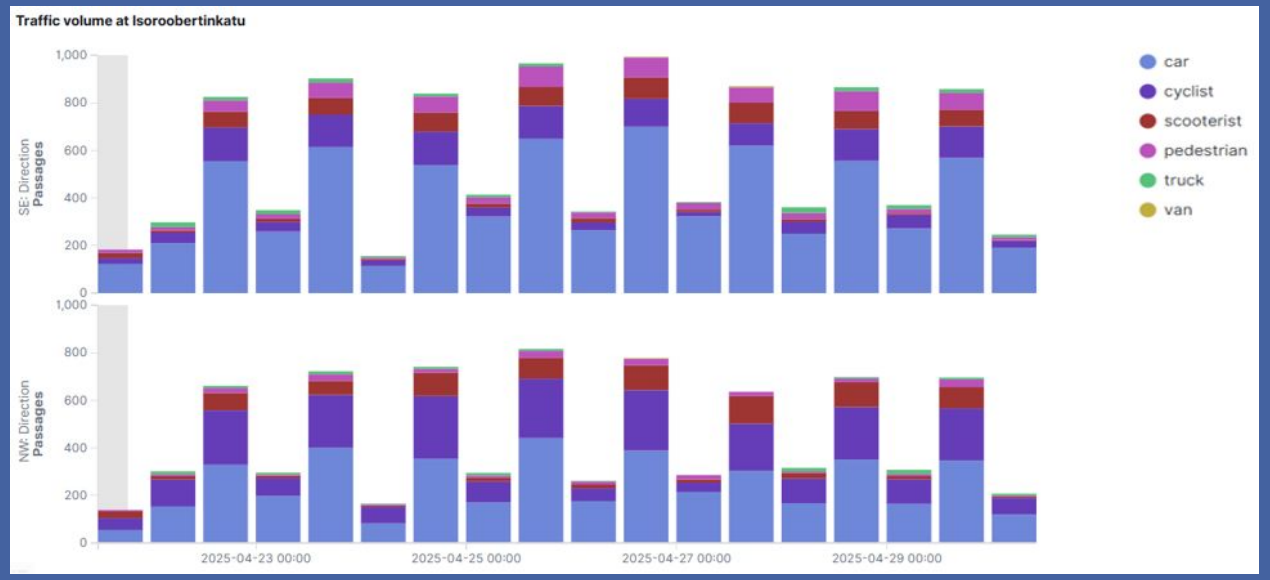


Figure 15. Stay duration view (Vuorikatu 18)



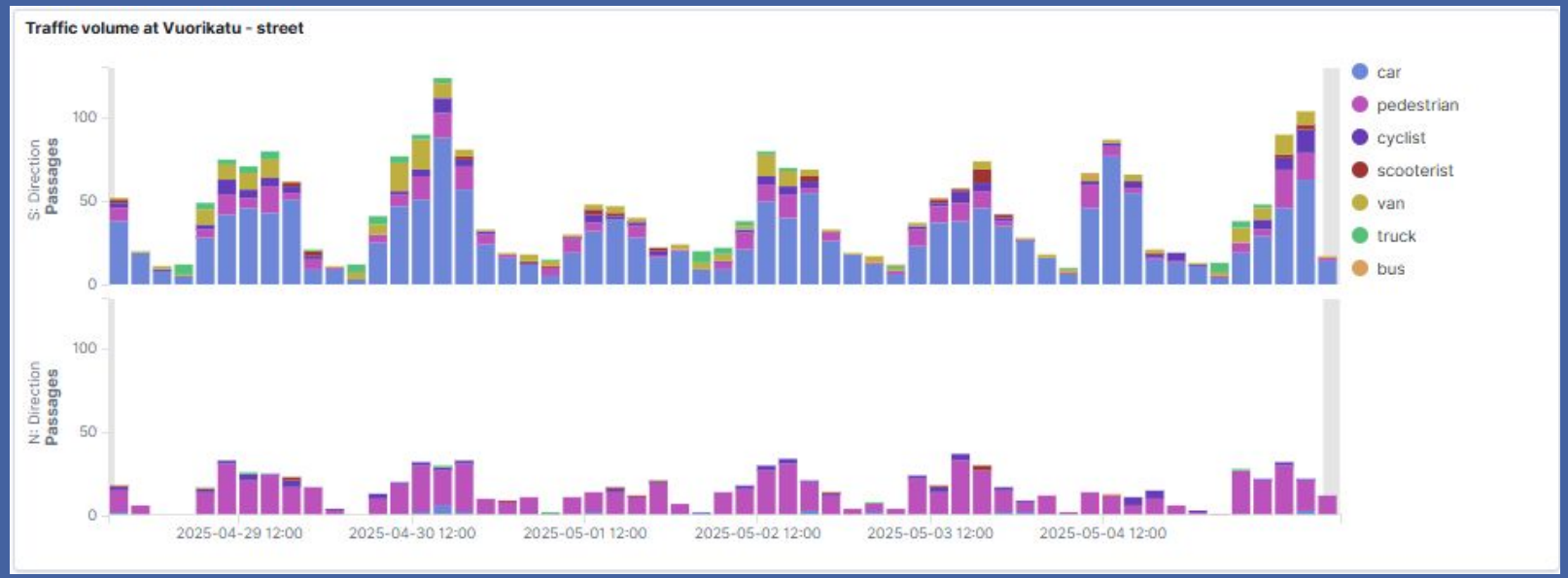


Figure 16. Traffic volume view

4. Results

- Technolution successfully developed a portable, stand-alone data collection system powered by its own energy source (batteries). Depending on the battery solution used (AGM or LiFePO4 batteries), the device can operate for up to 1 - 2 weeks on a single charge.
- The installation and commissioning of the stand-alone battery powered FlowCube AI camera system is quick and straightforward, with all configurations handled remotely
- The FlowCube AI camera can collect highly versatile data covering various modes of transport, including occupancy, parking duration, object classification, and traffic volumes.
- During the pilot, the stand-alone data collection systems were not subjected to any vandalism. This is likely due to the discreet appearance of the FlowCube sensor, which does not resemble a traditional surveillance camera.

Figure 17. FlowCube stand-alone data collection system with small footprint installed in a street environment

5. Key findings

- **This experiment aligns well with curbside management initiatives that many cities are currently pursuing. At Technolution, we see this as an important contribution toward making cities more livable.**

- **This pilot was instrumental in advancing the development and productization of our FlowCube AI sensor based stand-alone data collection system, moving us closer to delivering a comprehensive curb management solution.**

- **The FlowCube AI camera, integrated with edge computing and cloud infrastructure, provides a scalable platform for further development, enabling the implementation of new advanced features to improve public space management including.**

Key findings

Figure 18. The FlowCube AI sensor delivers comprehensive insights into the use of street space and various modes of transport.

6. Contacts

Company: Technolution AB

Name: Aapo Pöyhönen

Email: aapo.poyhonen@technolution.com

Phone: +358 400 356 844

Website: www.technolution.com/move/

FVH

Name: Matias Oikari

Email: matias.oikari@forumvirium.fi