# Tokyo Metropolitan Government

**Thijs Turèl**
AMS Institute

March 5th 2025

Gemeente Amsterdam

WAGENINGEN UNIVERSITY & RESEARCH

TU Delft

# AMS Institute as Innovation Ecosystem

Responsible Sensing Lab

# How quadruple helix works in practice

One city challenge: three different pilots with different collaborations between industry, government, academia and society.

City Challenge:

In order to spread crowdedness in the city

How can we change the route cars take, based on diverse city interests, using voluntary help of drivers?

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# Pilot 1


Goal: Improving safety school zones

Academy, industry, local government (13 partners under which Tomtom, Mercedes-Benz)


eit Urban Mobility

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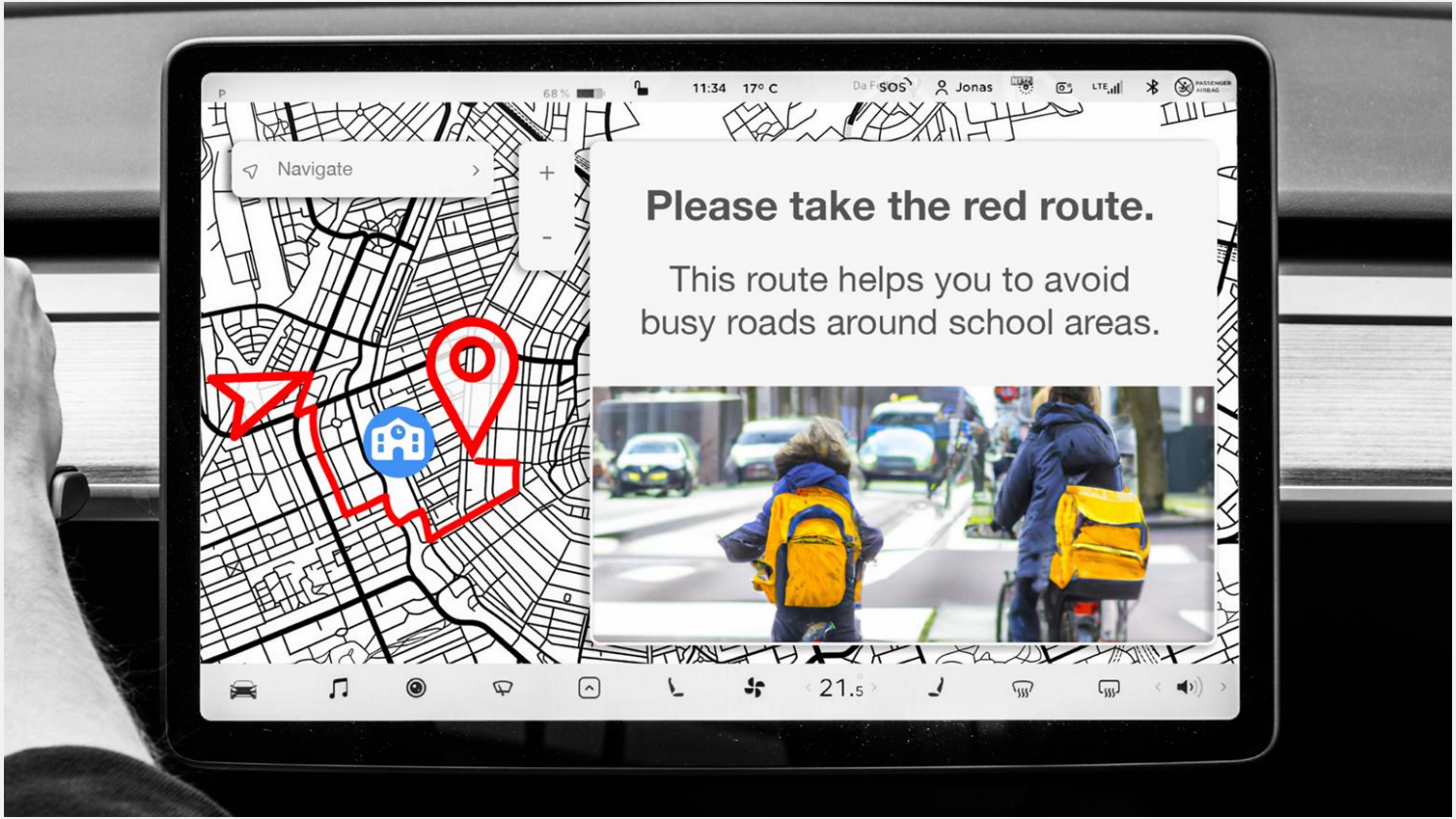


# Ideal for city, but will drivers accept it?

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# Pilot 2: How to design for acceptance and autonomy?

- Autonomy:
  - the ability to *freely choose* among different options
  - the availability of *meaningful* options

esdit

**Ethics of Socially Disruptive Technologies (ESDiT)**
**Philosophers of science**

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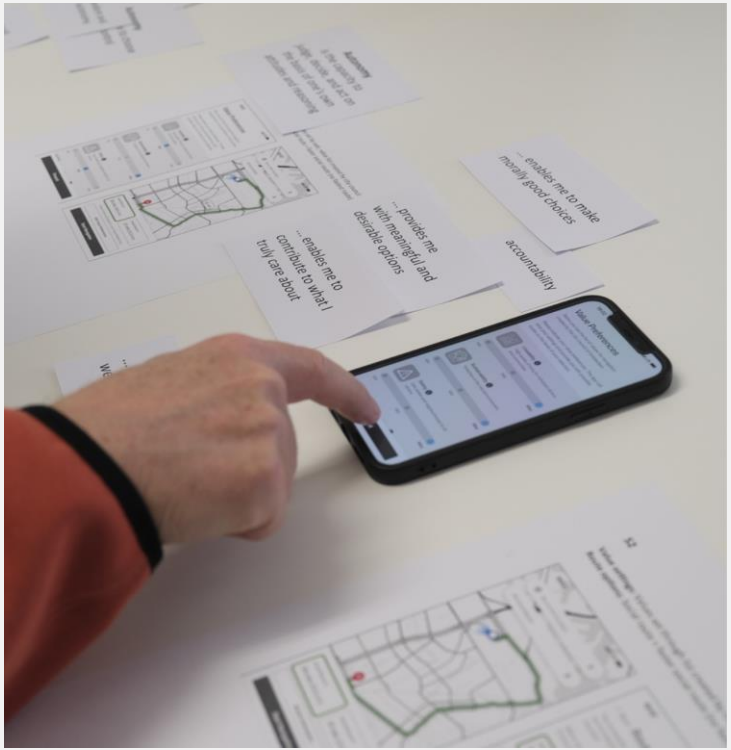
# Set-up



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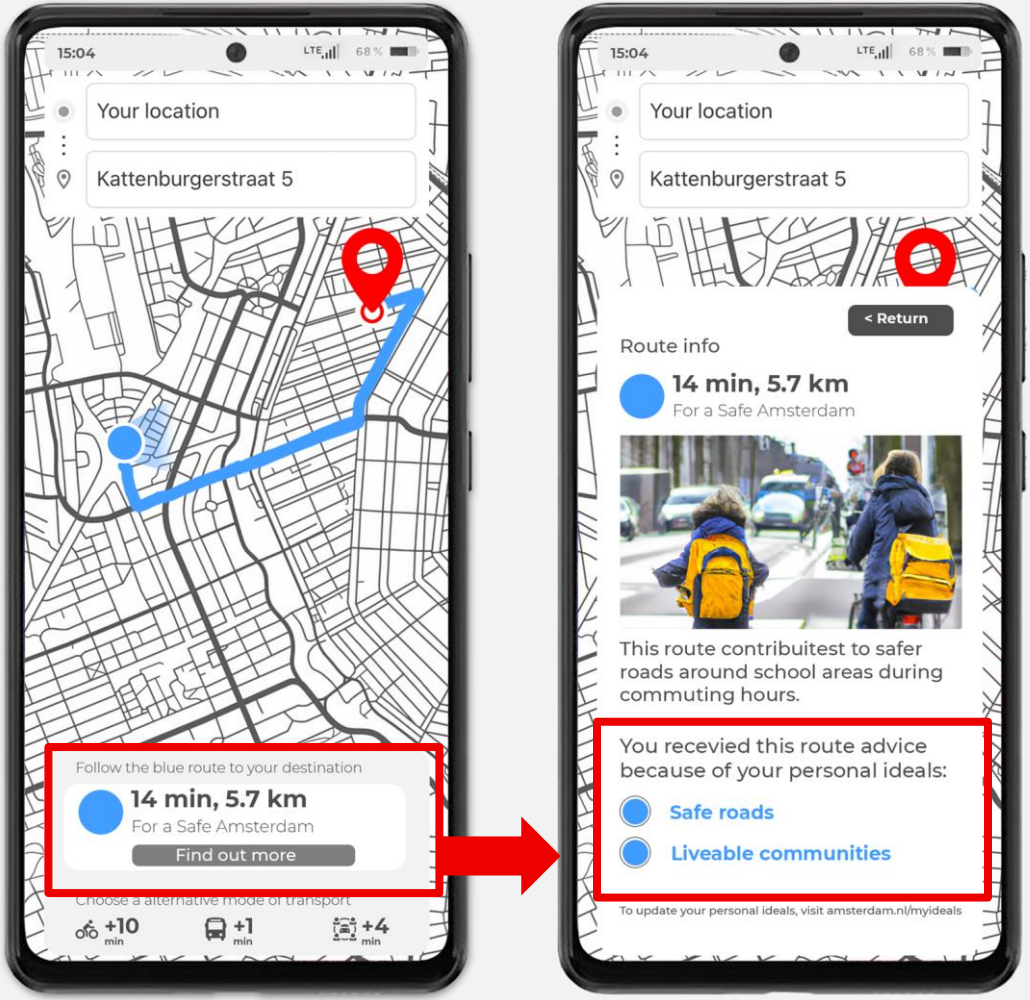
**Testing different versions of the navigation app**

1) which goals?
2) who set the goals?
3) how to get people to set goals?

to optimize acceptance and autonomy



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# Recommendations

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# Pilot 3: Digital Orchestration Public Space Consortium

Gemeente Amsterdam · Gemeente Almere · Goudappel · Technolution · VIANOVA · TNO innovation for life · AMS Amsterdam Institute for Advanced Metropolitan Solutions

National Innovation Funding for Digital Orchestration of Public Space Ecosystem.

20 Proof of Concepts

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# Pilot concept

Pilot on preventing car pollution near parks when really busy.
Voluntary route advice for de-tour.

**Real-time travel information Regulation:** New European regulation that allows cities to express road priorities to navigation aid providers

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# Recap: How quadruple helix works in practice

One city challenge requires different collaborations between industry, academia, public sector and society.

Challenge to connect one project to another

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**Thank you! Questions?**

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# Amsterdam Generic Scanning Service


Photo Mike de KReek

Responsible Sensing Lab

# Scanning bicycle as:

infrastructure


means of enforcement


point of contact


Photo & Design:
Tessa Steenkamp

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**How do you reach an agreement with related organizations when creating solutions and services (financial matters/division of responsibilities/roles)?**

Currently, discussions on digital autonomy

‘European governments run American software on Chinese hardware’

In digital competencies: Government needs to do more, outsource less

- Scan car procurement example

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## Are you using citizens personal data?

GDPR ‘data minimization principle’

When not necessary, we do not do it

Projects: mmwave, multi party computation, digital canal study,

IRMA -app, Yivi app

Different approach when citizens have something to gain.

‘You are entitled to benefits’ project

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**Is there any resistance from citizens to new solution services?**

Generative AI for urban planning

Preventing surveillance growth

Social problems because of smart phone addition

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# Circularity

Building with wood instead of concrete

Carbon emissions

Material footprint of IT

Waste problem old Amsterdam

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# Responsible Sensing Lab

**Thijs Turèl**

Initiator Responsible Sensing Lab and Lab Lead

**Sam Smits**

Lab lead Responsible Sensing Lab

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Program Manager Digitisation & Innovation

**Anouk Wieleman**

Communications and Project Manager

**Girish Vaidya**

PostDoc at TU Delft

**Fabian Geiser**

Project Manager Responsible Sensing Lab

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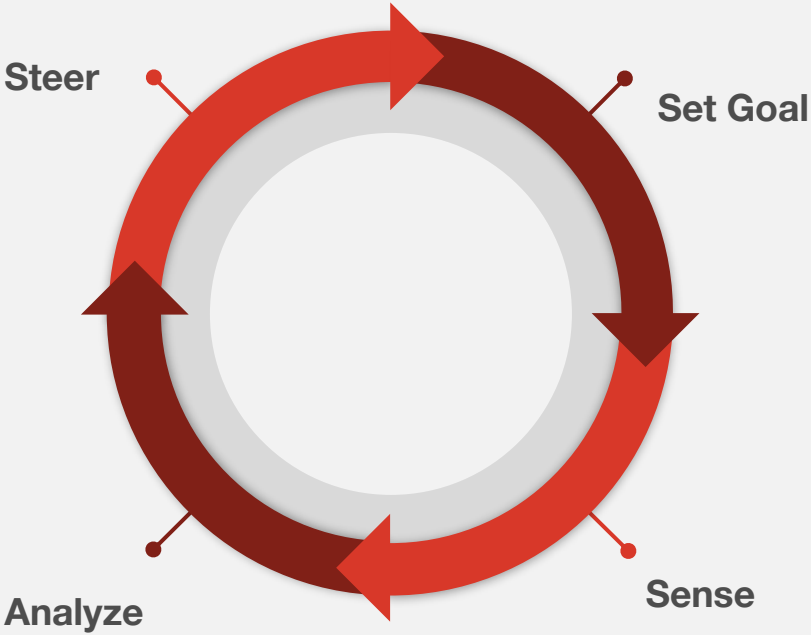
# City as a control loop





Garbage

Taxi regulation

Safety

## INCLUSIVE

Our digital city is inclusive. We take into account the differences between individuals and groups, without losing sight of equality.

## CONTROL

Data and technology should contribute to the freedom of citizens. Data are meant to serve the people. To be used as seen fit by people to benefit their lives, to gather information, develop knowledge and find room to organise themselves. People stay in control over their data.

## TAILORED TO THE PEOPLE

Data and algorithms do not have the final say. Humanity always comes first. We leave room for unpredictability. People have the right to be digitally forgotten, so that there is always an opportunity for a fresh start.

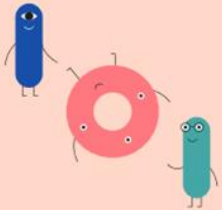
## OPEN AND TRANSPARENT

What types of data are collected? For what purpose? And what are the outcomes and results? We are transparent about this.

## LEGITIMATE AND MONITORED

Citizens and users have control over the design of our digital city. The government, civil society organizations and companies facilitate this. They monitor the development and the social consequences.

## FROM EVERYONE FOR EVERYONE



Data that the city, companies and other organizations generate from the city are held in common. Everyone can use them. Everyone can benefit from them. Together we make agreements about this.

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# The Responsible Sensing Lab explores how to integrate public values in the design of smart systems in public space

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## Trust

- Amsterdam algorithm registry
- Amsterdam sensor registry (inc signage)
- Mobile scanning: citizen participation in tech development

## Privacy

- MMwave sensing
- Multiparty computation
- Shuttercam
- Consortium Smart Doorbells

## Sovereignty

- Procurement decision aid

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# Algorithm register

## Algorithmic systems of Amsterdam

Learn about the use cases where we currently utilise algorithmic systems as part of our city services.

Economic Services Departments

### Automated parking control

In Amsterdam, the number of cars allowed to park in the city is limited, keeping the city liveable and accessible. The municipality checks whether a parked car has the right to be parked, for example, because parking fees have been paid via a parking meter or app, or because the

Economic Services

### Illegal holiday rental housing...

Amsterdam has limited living space; both for citizens and visitors. If a citizen wants to rent out their home or houseboat to tourists, they need to meet certain requirements. For example, they can do so for a maximum of 30 nights per year and a maximum of 4 people at a time. They


Community services

### One and a half meter monitor

Retired

Because of COVID19 measures have been taken to prevent person to person detection, one of the most influential and important new regulation is to keep 1.5 meters distance from each other. To help

https://algoritmeregister.amsterdam.nl/en/ai-register/

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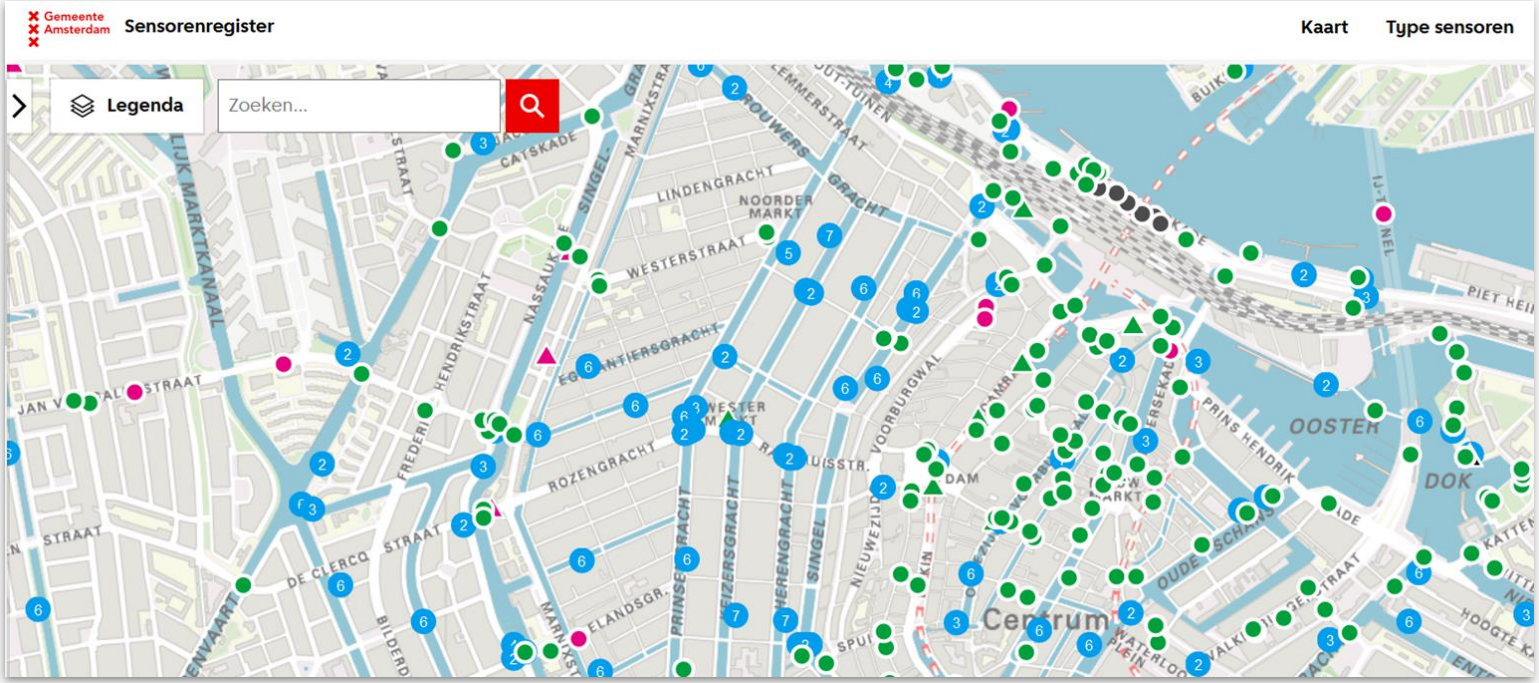
# Sensor register




https://sensorenregister.amsterdam.nl/

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# Citizen participation mobile scanning use-cases

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# Millimeter wave sensing

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# City needs for people counting

Maintain safety

Plan infrastructure

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# Current Implementation

Cameras are considered to be the only option for people counting

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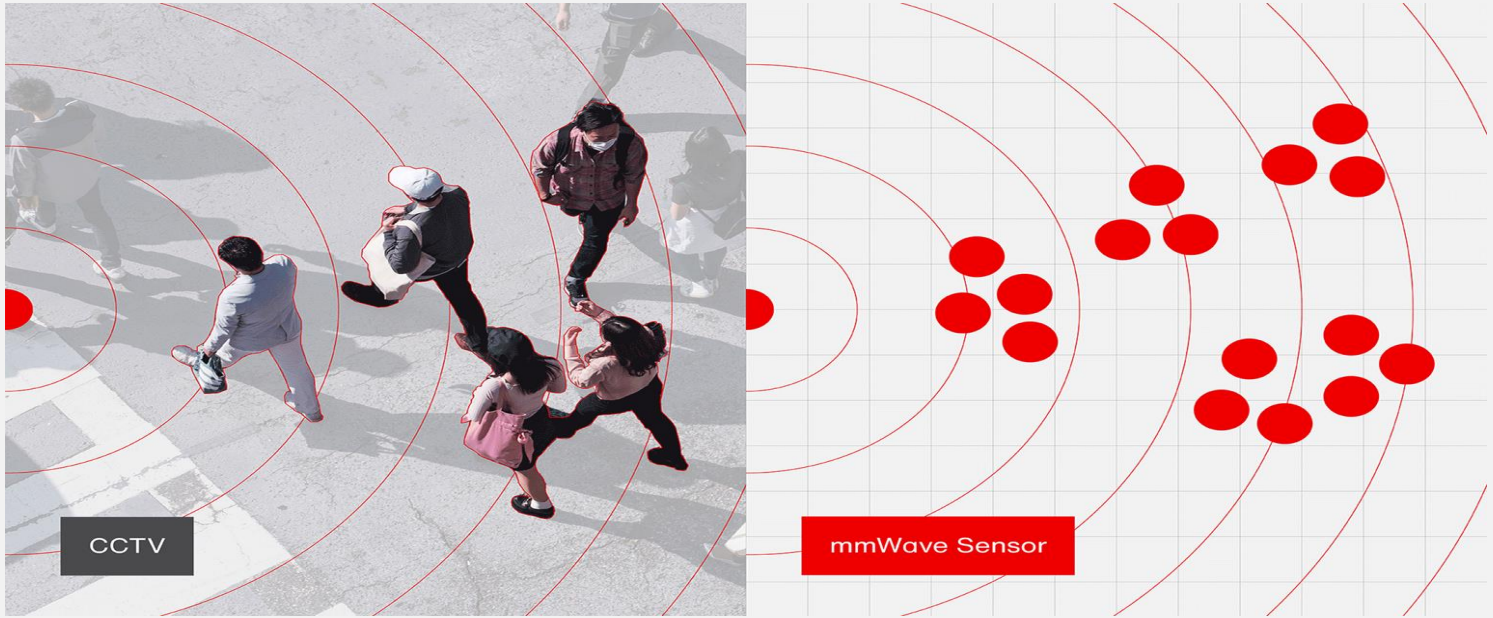
# Low information imaging



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# mmWave sensing


Installation


What it is looking into

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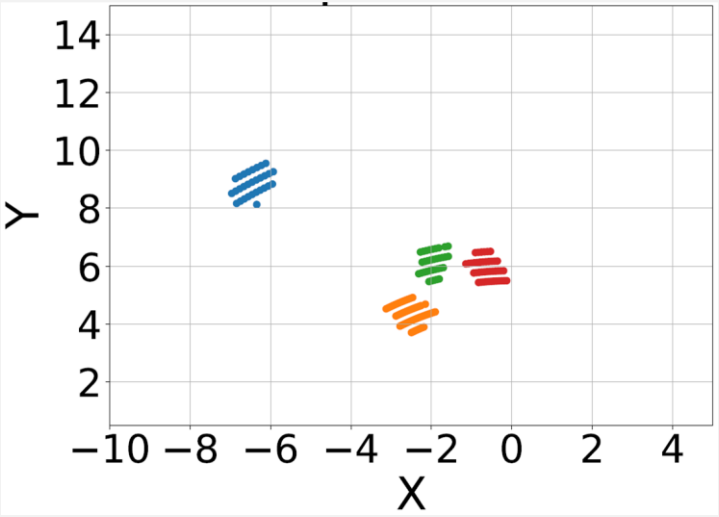
# Privacy Preserving

Camera scene




How mmWave sees it

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# Datacollection and labeling

- 5 volunteers walked for more than 7 hours in different formations
- More than 20000 frames collected and labelled for training

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# Multiparty computation

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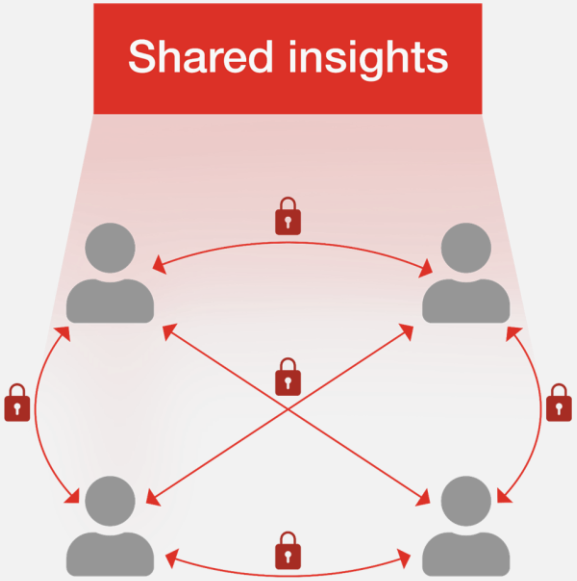
# Multi-party-computation (MPC)

- MPC is a cryptographic method.
- Enables multiple parties to draw insights from data without revealing the underlying, sensitive data to each other (preserving privacy)
- Has been discussed as a privacy preserving approach in the healthcare context. We are exploring applications in the city.



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# Shuttercam

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# Problem

- Increasing amount of cameras used by city and others.
- 1 out of 5 Amsterdam citizens finds this annoying (2023, citizen panel, ~900 people)
- City government has promised “ citizens should be able to be **unobserved in public space**”


Leiden University students fight against classroom surveillance cameras

NEWS POLITICS & SOCIETY

Katrien Nivera

December 15, 2021

1 minute read

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# Proposal: ‘Shuttercam as standard’

**Elisabeth IJmker (GroenLinks)**

## City council member

Gemeente Amsterdam

**Motie**

| | |
|---|---|
| Datum raadsvergadering | 19 en 20 juli 2023 |
| Ingekomen onder nummer | 269 |
| Status | Aangenomen |
| Onderwerp | Motie van het lid IJmker inzake Maak Shuttercam de standaard |

**Onderwerp**

Maak Shuttercam de standaard

**Aan de gemeenteraad**

Ondergetekende heeft de eer voor te stellen:

De Raad,

Gehoord de discussie over Voorjaarsnota 2023

Overwegende dat:

- Eén van de uitgangspunten van de Datastrategie is dat Amsterdammers zich onbespied en anoniem kunnen bewegen in de openbare ruimte
- De afgelopen jaren met het Shuttercam-project is onderzocht hoe we camera's in de openbare ruimte zo kunnen ontwerpen dat ze rekening houden met waarden als privacy, autonomie en transparantie
- Dit project een deel van de ambitie van de gemeente Amsterdam vervult op het gebied van verantwoorde digitale technologie zoals onder andere benoemd in het tada manifest
- Dit project ondertussen succesvol is afgerond

**Verzoekt het college van burgemeester en wethouders**

- Te onderzoeken hoe in aanbestedingsvoorwaarden van cameradiensten of -produ... de gemeente Amsterdam inkoopt standaard de voorwaarde toeg... camerasystemen visueel controleerbaar uit of a...
- Indien nodig in kaart te brengen ...

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# Smart doorbells

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# Smart doorbells

- 1.200.000 (est. 2023)
- Regulations not enforced
- History of hacking
- Opaque data management

# Smart Doorbells


AMSTERDAM INSTITUTE FOR **ADVANCED METROPOLITAN SOLUTIONS**

Image by AMS Institute Datavisualization Team
Data collection by Thijs and Ysbrand Turèl, May 2022
Data collection by Carlotta Henning, April 2023
Data collection by Carlotta Henning, January 2024

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I spy: are smart doorbells creatin ×

https://www.theguardian.com/lifeandstyle/2021/jun/26/i-spy-are-smart-doorbells-creating-a-global-surveillance-network

Photo manipulation: Peter Crowther. Photographs: Getty Images, Alamy

# I spy: are smart doorbells creating a global surveillance network?

They were sold as gadgets that meant you would never miss a delivery. But now doorbell cameras – from Amazon's Ring to Google's Nest – are recording our every move

by Sam Wollaston

Sat 26 Jun 2021 09.00 CEST

I have got a new doorbell. It's brilliant. It should be; it cost £89. It's a Ring video doorbell: you'll have seen them around. There are others

Surveillance

# Amazon's Ring is the largest civilian surveillance network the US has ever seen

*Lauren Bridges*

Tue 18 May 2021 14.51 CEST

374

One in 10 US police departments can now access videos from millions of privately owned home security cameras without a warrant

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# Goals Consortium

1) nationwide questionnaire into citizen experiences
2) local strategies to alleviate the problems
    a) regulations
    b) other
3) building a Global / European consortium for a ‘feature request’ to vendors

# Prototype of a procurement decision aid for cities to improve digital strategic autonomy

**Fabian Geiser**
**Girish Vaidya**
**Thijs Turèl**

AMS Institute

18 September 2024

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Local governments increasingly rely on technology provided by market parties.

This creates dependencies which pose risks to the sovereignty of governments, diminishing their control and ability to carry out the tasks they are responsible for.




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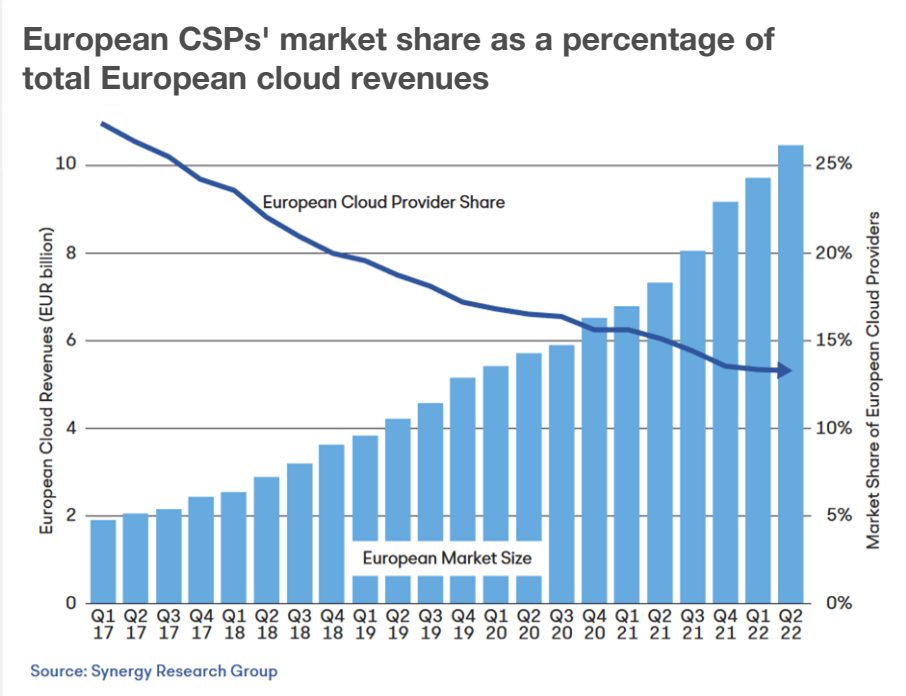
**Source**: NL TImes 'Amsterdam replacing Chinese CCTV & traffic cameras over spying, human rights concerns' June 2024 (link)




**Source**: Clingendael report 'Policy Brief Too late to act? Europe's quest for cloud sovereignty' March 2024 (link)


What are the “dials and buttons” we can use to become more strategically autonomous as a city?


Prototype for a decision aid
that helps cities to incorporate
strategic autonomy into their
decision making process on
making and or buying digital
services.

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# Dimensions of strategic autonomy

Literature review and expert interviews showed that there is no commonly agreed definition of strategic autonomy.

The need for strategic autonomy can be judged based on the **criticality of a functionality**.

Dimensions of strategic autonomy can be grouped in **internal and external factors** affecting the cities ability to be in **control**:

- Internal: inhouse tech. knowledge and capabilities, ability to maintain and grow tech. knowledge and capabilities, legal and financial leverage, …
- External: market conditions, location of (sub-)suppliers, laws and regulations, ...

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# Extra slides

## (not part of main presentation)

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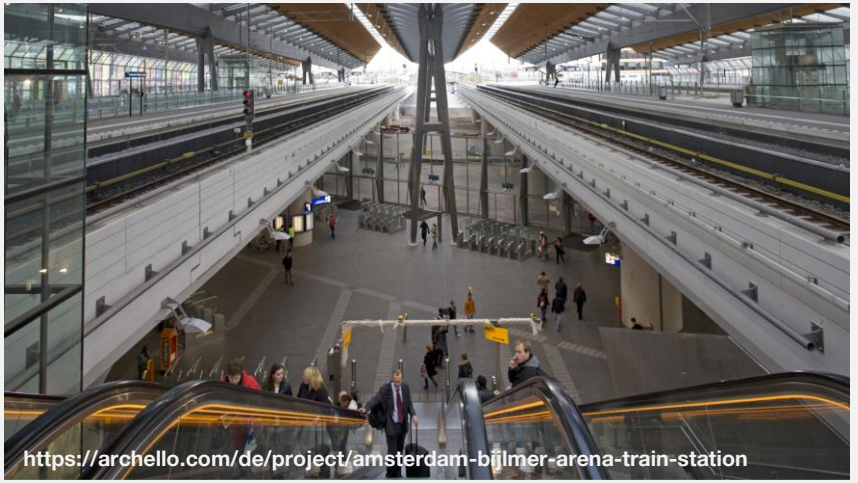
# Events at the Johan Cruyff Arena and Ziggo Dome can lead to unpleasant and unsafe overcrowding at the station Amsterdam Bijlmer ArenA.


https://archello.com/de/project/amsterdam-bijlmer-arena-train-station


https://www.parool.nl/cs-bf189305

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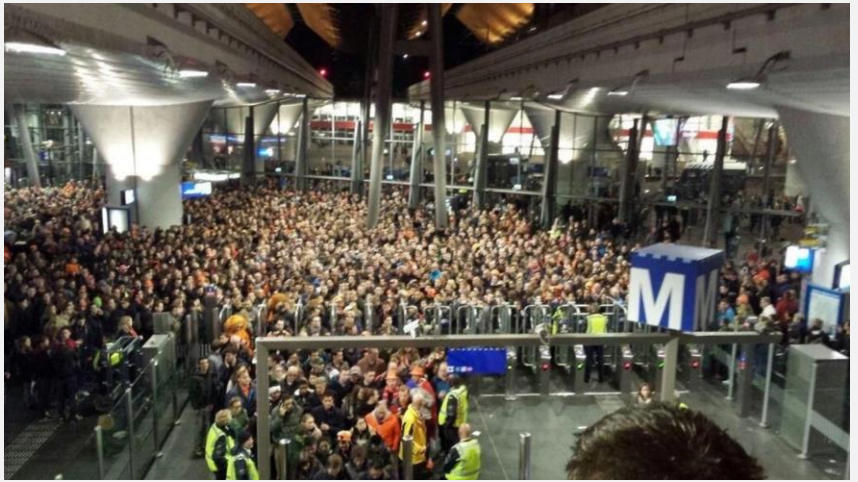
## Goal of MPC solution:

**To deliver a positive travel experience by distributing passengers among the available means for public transportation without sharing commercially sensitive data.**



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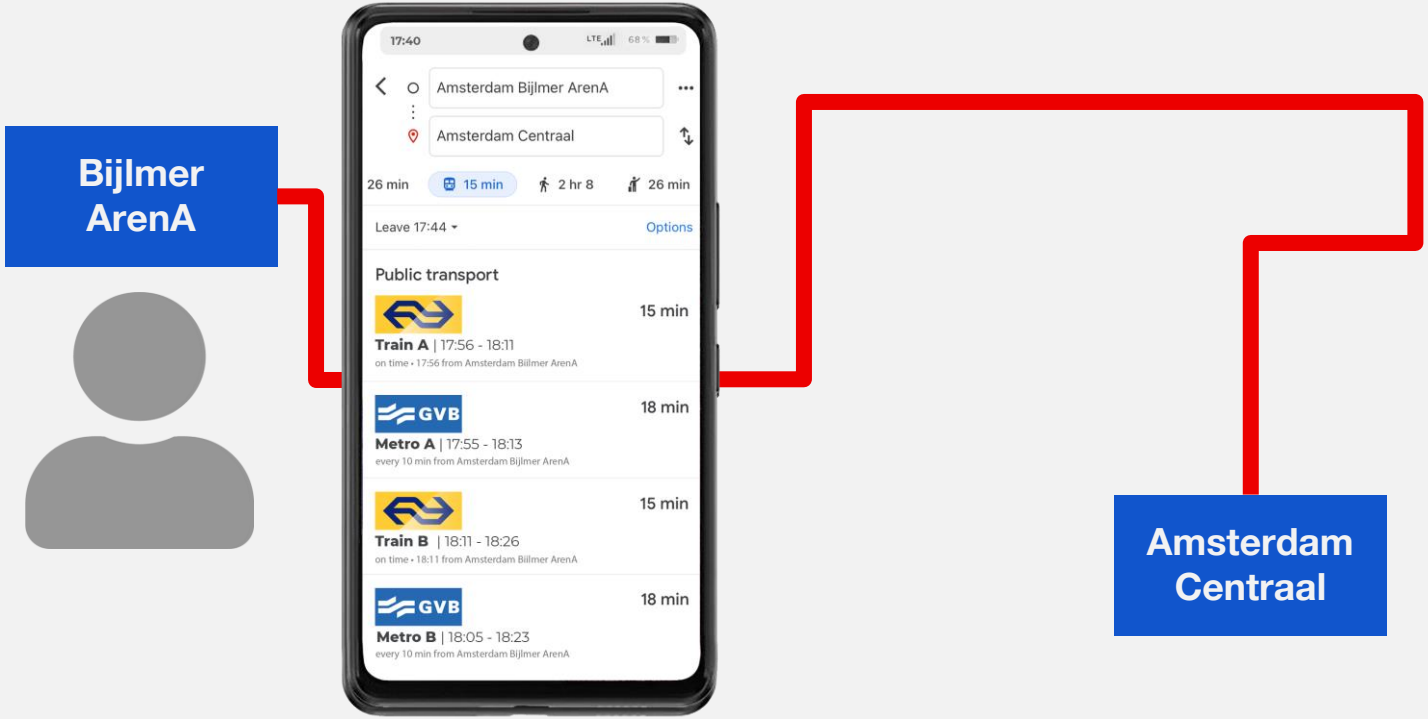


A public transport user wants to travel from the Bijlmer ArenA to Amsterdam Centraal. Google Maps presents options by different providers but not all options have capacity. The User needs to know which option to take, but GVB and NS prefer not to share all capacity information as it is commercially sensitive information.

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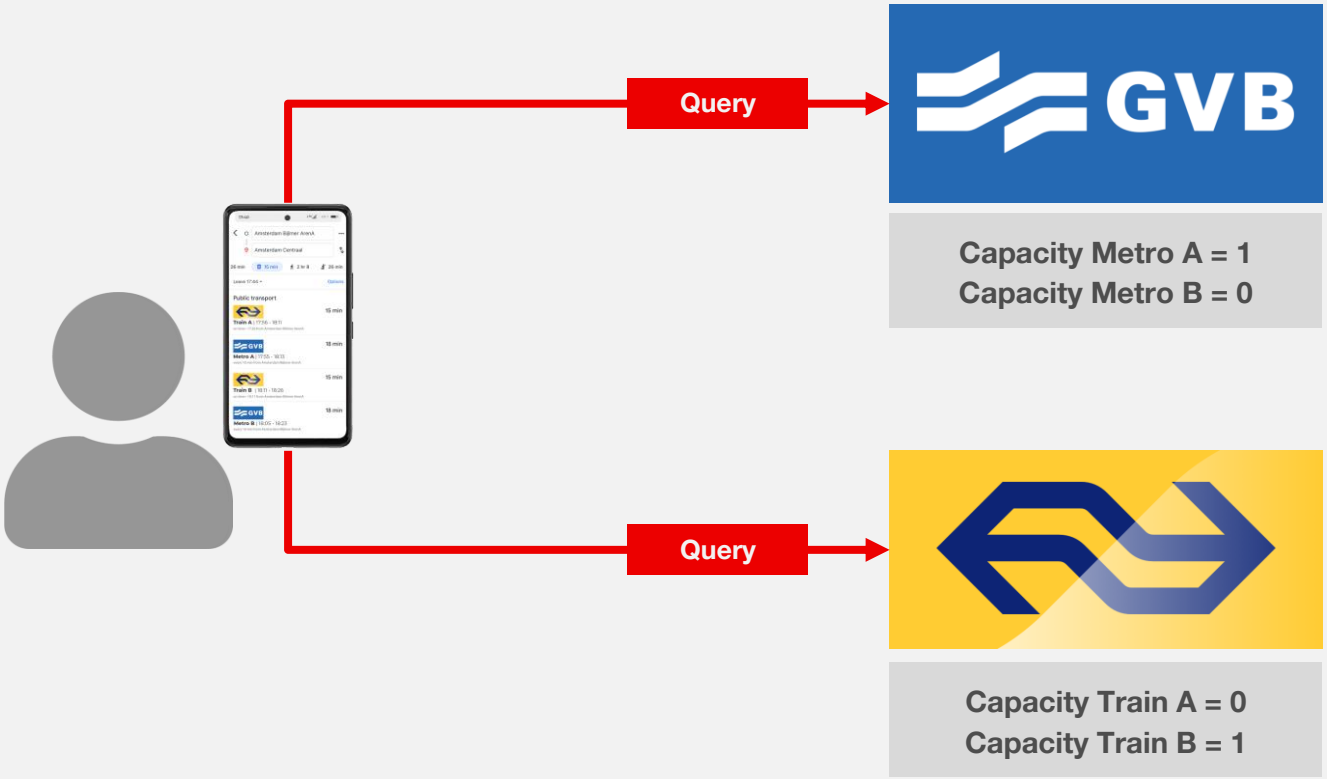


User app queries GVB and NS.
(1 = the vehicle has capacity available, 0 = the vehicle has no capacity available.)

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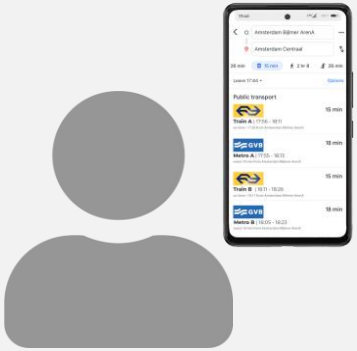

Public key

Stichting Public Key

Public key

GVB

Capacity Metro A = 8834
Capacity Metro B = 1641

Capacity Train A = 5302
Capacity Train B = 9476

NS and GVB encrypt their available capacity for the upcoming vehicles, They do this by using a public key published by the independent organization “Stichting Public Key” (This is where the MPC code resides).

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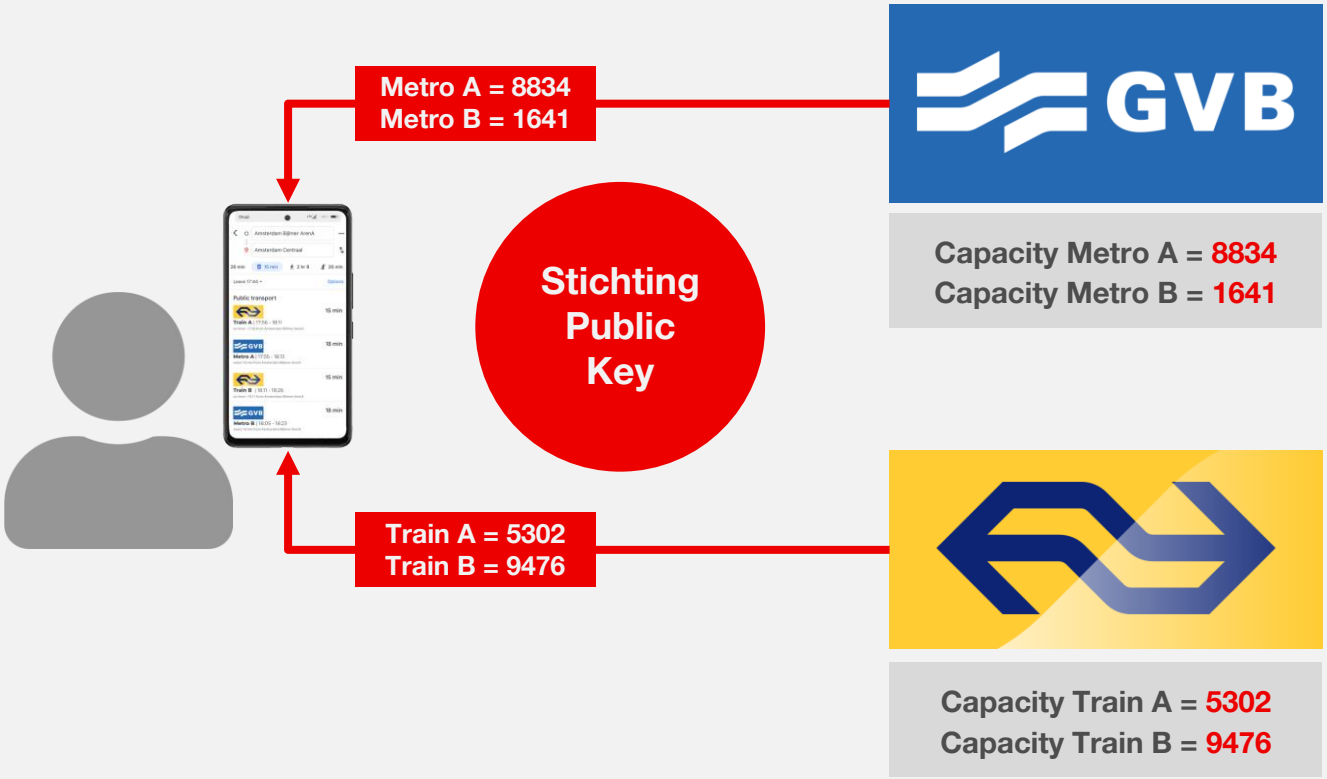


The encrypted values are sent to the users Google Maps app. Google Maps now knows the encrypted values and whether they come from NS or GVB.

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GVB Metro A = 8834
GVB Metro B = 1641
NS Train A = 5302
NS Train B = 9476

Capacity Metro A = 8834
Capacity Metro B = 1641

Capacity Train A = 5302
Capacity Train B = 9476

Google Maps sends only the encrypted values to Stichting Public Key. The Stichting only gets the encrypted values and does not know where they come from (NS or GVB).

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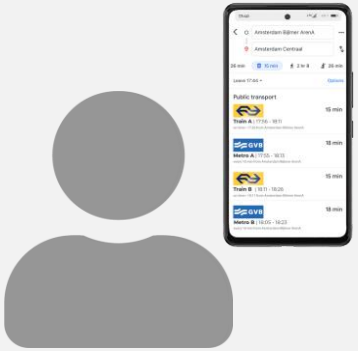

GVB Metro A = 8834
GVB Metro B = 1641
NS Train A = 5302
NS Train B = 9476

Stichting Public Key

Secret Key

8834 = 1
1641 = 0
5302 = 1
9476 = 0

GVB

Capacity Metro A = 8834
Capacity Metro B = 1641

Capacity Train A = 5302
Capacity Train B = 9476

The Stichting decrypts the values using a secret key (not shared with anyone else) and sees which of the options has capacity.
(1 = the vehicle has capacity available, 0 = the vehicle has no capacity available.)

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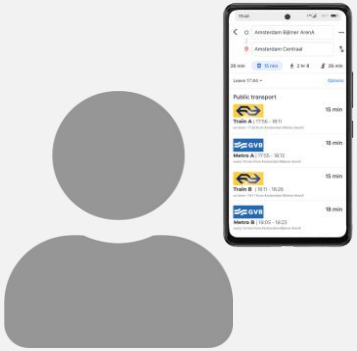

**GVB Metro A = 8834**
GVB Metro B = 1641
NS Train A = 5302
NS Train B = 9476

**Stichting Public Key**

**Take 8834 (random choice)**

GVB

Capacity Metro A = 8834
Capacity Metro B = 1641

Capacity Train A = 5302
Capacity Train B = 9476

The Stichting chooses one of the values that indicate capacity at random and sends it back to the users Google Maps app. The user's app can make the connection between the encrypted value and the related owner. It knows that GVB Metro A has capacity.

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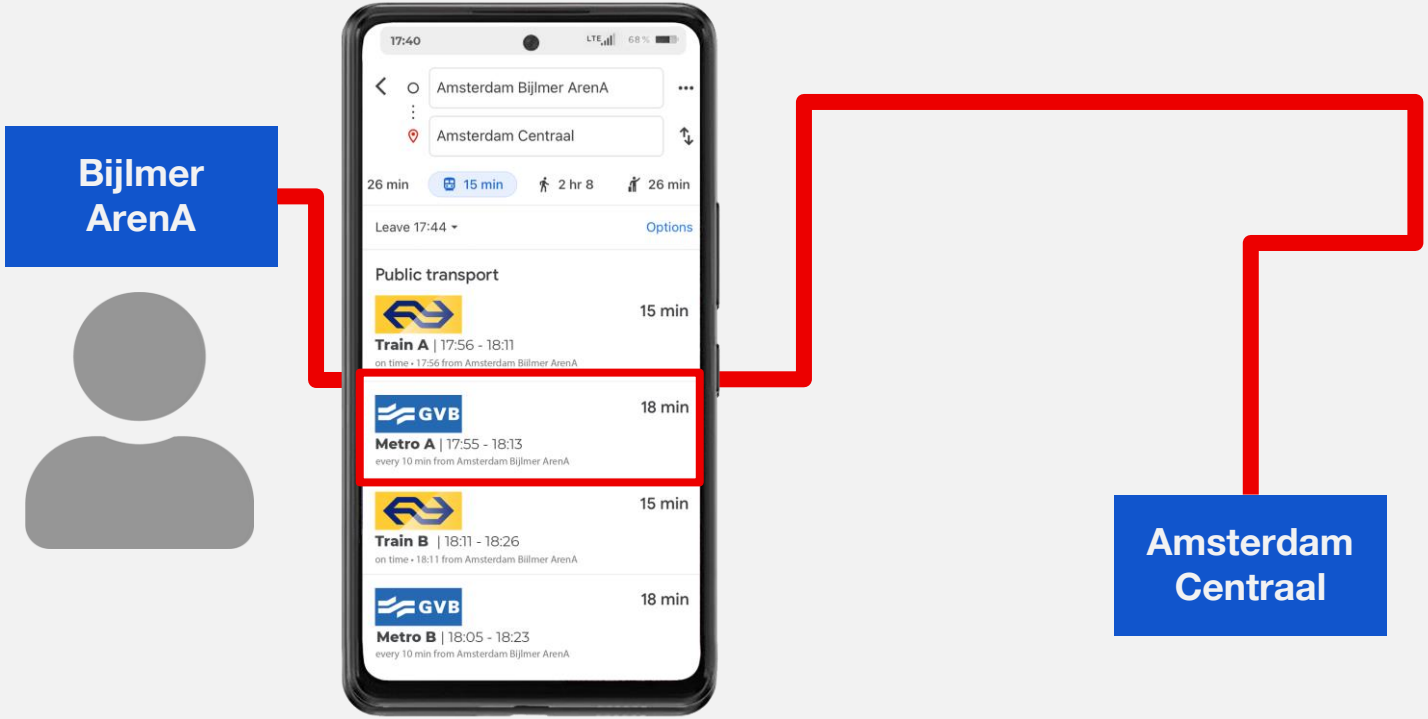


The user takes GVB Metro A to travel from the Bijlmer ArenA to Amsterdam Centraal.