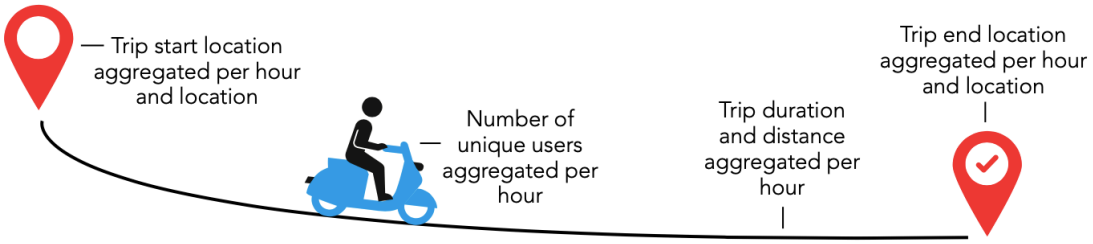
CDS-M Use Case

From policy needs to use cases



Preface

The mobility chain is changing at the speed of an express train: transport is becoming increasingly smart, and infrastructure, modes of transport and citizens are increasingly interconnected through technical applications. Data sharing has become an integral part of the mobility chain: public authorities ask commercial operators for data in order to monitor, learn and manage the public space. Mobility does not end at the city limits, but Dutch cities currently set their own requirements for data sharing in collaboration with commercial operators. The City Data Specification for Mobility (CDS-M) provides the opportunity to organize data sharing uniformly and efficiently. This document discusses the possible uses of CDS-M in use cases in the G5 largest cities in the Netherlands.

1 Definition based on opportunity and need

The CDS-M enables information to be obtained on the use and distribution of shared mobility in cities by collecting data in a standardized format. This standardization enables data to be analysed both on individual cities and across cities. This interoperability is important if we are to achieve a national Mobility as a Service (MaaS) system.

The CDS-M comprises the 'standard', the technical design, and the 'agreement', which states what organizations are involved in data processing, what the processes are and how the data is stored. The 'standard' takes the form of an Artificial Programming Interface (API), a code written in Interface Descriptive Language (IDL), a language that any operating system can read. An API is thus a communication bridge between two different systems.[1] The metaphor of a 'plug' is hence often used for an API, as it 'plugs' one database into another. The CDS-M connects the shared mobility operator's system with the municipal system in the same way.

At this stage of the CDS-M project, work has only been taking place on the 'standard'. The next stage will be to optimize the 'standard' and develop the 'agreement'. The following documents relating to the 'standard' have been produced: the first version of a 'CDS-M 4.0' functional design, a 'principles document' and a 'CDS-M Blueprint'. These documents raise various questions and dilemmas in the many areas associated with the CDS-M (e.g. ICT, data science, urban planning, governance, privacy and security), which need to be considered in more detail.

These areas of expertise will need to collaborate in the next stage of the CDS-M project to move the 'standard' forward and develop the 'agreement'. That stage will therefore involve setting up a CDS-M working group comprising mobility operators, urban planners, data scientists, code developers, Data Protection Officers, security experts and staff of the Dutch Ministry of Infrastructure and Water Management and mobility teams from the G5. The aim is for the G5 and the Ministry to nominate staff in their organizations who comply with these profiles. The working group will be divided into the following sub-teams: (1) a technical team (code developers), (2) an analysis team (urban planners & data scientists), (3) a legal team, (4) a security team and (5) a governance team.

[1] Wanatha, H. A. O., Un, M. D. E., Atmint, A. N. N. & Nielsen, G. INTERFACE DEFINITION LANGUAGE EXTENSIONS. 2, (2017).

The CDS-M working group needs a tangible starting point. The proposal is to have cities draw up specific use cases before it starts work. Based on these tangible use cases, it can focus on optimizing the 'standard' and developing the 'agreement'. For the 'standard', metrics[2] will need to be created and consideration given to ways of incorporating Privacy by Design (PbD). The 'agreement' still needs to be developed in its entirety, and it needs to be decided what Privacy Enhancing Techniques (PETs) and security measures should be used.

The use cases are important in this process, as the legal and security requirements for the 'standard' and the 'agreement' will differ from one use case to another, since the 'purpose of processing' may be different for each use case, along with each operator's active fleet. The GDPR also requires a clear argument for each use case before data can be requested. The arguments and the information in the 'agreement' need to be set out in a PIA before requesting data. If there is sensitive data, the PIA must also be communicated to the Dutch Data Protection Authority. Once this has been done, the use cases can be tested in a pilot.

2 What are the needs?

Every city has its own information requirements regarding shared mobility in its area. Cross-pollination between cities can be set in motion by using different use cases from the G5 cities, enabling a wide range of use cases to be tested in future pilots.

A start has been made on identifying needs through an email survey of policy questions in the G5 cities. The results of the survey are summarized below, solely highlighting the policy questions that can be answered (at least partly) with quantitative information obtained using a standard.

[2] The metrics are the quantitative assessment yardsticks incorporated in the 'standard'. These will determine the level of detail in the data request and the frequency. They need to comply with the principles of purpose limitation and data minimization. How these principles are implemented will differ from one use case to another. The metrics need to be suitable for the various use cases, so it is important for use cases to be created that can be further developed in the CDS-M working group.

The email correspondence raised many policy questions that can only be answered using qualitative data, for example: 'How many people does shared mobility move away from e.g. public transport?' and 'What effect does shared mobility have on private car ownership, and do people sell their cars when they start using it?'. Questions of this kind are better answered by means of surveys or interviews. Policy questions of this kind put forward by the G5 are therefore not included in this document.

Under the GDPR and the Charter of Fundamental Rights, data may only be requested if there is a legitimate purpose for processing it and the principles of purpose limitation, data minimization, storage limitation, integrity and confidentiality and the conditions of subsidiarity and proportionality are met (Article 5 & 6.1 (c) of the GDPR and Article 52 (1) of the Charter of Fundamental Rights). It is important, therefore, to formulate specific policy aims with a clear purpose of processing, translated into data requirements. The policy needs for each city are set out below.

2.1 Amsterdam

Amsterdam would like to obtain information on shared mobility flows in the city so as to identify the most popular routes and hot spots. Based on this information, the infrastructure can be adapted, for example cycle tracks widened, or parking areas created or made more visible. This will not only encourage shared mobility but also ensure safety and avoid pollution of the public space. Hot spots are places where users often park their assets, and they can provide an indication of the clustering and pollution of the public space (e.g. pavements). Amsterdam would therefore like to use the information from the CDS-M and TOMP-API to carry out a parking analysis and, if necessary, set clustering requirements on that basis. If the parking analysis reveals that the availability of shared mobility is not disproportionately distributed across the city, distribution requirements can also be set to increase inclusion and accessibility. Amsterdam would like to enforce the clustering and distribution requirements through the TOMP-API. It would also like to enforce the rules in the permit area and maximum vehicle numbers. While it is desirable to regulate maximum speed, this is not a priority.

Policy on shared mobility

- **Parking area performance analysis**
- Policy question: *How are the existing parking areas being used? Which parking areas need to be enlarged/reduced/removed or made more visible?*
- Purpose of processing: Encouraging the use and findability of shared mobility

- **Use analysis**
- Policy question: *In which districts is shared mobility being used?*
- Purpose of processing: To increase inclusion and accessibility

Planning – Safeguarding the quality of the public space

- **Use-based urban planning**
- Policy question: *Where in the city should the infrastructure be adapted to shared mobility?*
- Purpose of processing: Safety and throughflow

- **Use-based urban planning**
- Policy question: *Where in the city should parking areas be created?*
- Purpose of processing: To safeguard the quality of the public space and encourage shared mobility so as to achieve a clean, low-car city

- **Cluster and pavement management**
- Policy question: *At what places is shared mobility creating nuisance/unsafe situations in the public space?*
- Purpose of processing: To regulate undesirable and unsafe situations

Enforcement

- **Regulating maximum vehicle numbers/fleet analysis**
- Policy question: *How many vehicles does each operator have operating in the city?*
- Purpose of processing: Enforcing the permits

- **Regulating the permit area/use analysis**
- Policy question: *Are vehicles being parked outside the permit area?*
- Purpose of processing: To enforce the permits

- **Regulating speed limits/speed checks**
- Policy question: *Do the vehicles have the correct speed limits built in?*
- Purpose of processing: Enforcing the permits and avoiding unsafe situations

2.2 Utrecht

It emerges from the email correspondence that the City of Utrecht would like more information on the proportions of shared mobility versus normal bicycle and car traffic in the city, to gain information on the extent to which other modes of transport are being replaced. The purpose of processing is not stated, but I assume that Utrecht would like to obtain this information to determine what types of shared mobility contribute to making the mobility network more sustainable and then promote that trend. Utrecht also says it would like information on the contribution that shared mobility makes to congestion in the city during peak hours. The purpose of processing is unclear. In addition, Utrecht would like to use data to increase the findability of shared mobility by making it more visible at stations and Park & Ride facilities. The city would also like to ensure that shared mobility does not create any undesirable or unsafe situations in the public space.

Policy-making on shared mobility

- **Car reduction analysis and overall transport impact analysis**
- Policy question: *What pressure does shared mobility place on the mobility system? Is shared mobility replacing other modes of transport?*
- Purpose of processing: Information is needed as a basis for decisions on subsidies

- **Parking area performance analysis**
- Policy question: *How are the existing parking areas being used? Which parking areas need to be enlarged/reduced/removed or made more visible?*
- Purpose of processing: Encouraging the use and findability of shared mobility

Planning – Safeguarding the quality of the public space

- **Use-based urban planning**
- Policy question: *Where in the city should parking areas be created?*
- Purpose of processing: To safeguard the quality of the public space and encourage shared mobility so as to achieve a clean, low-car city

- **Cluster and pavement management**
- Policy question: *At what places is shared mobility creating nuisance/unsafe situations in the public space?*
- Purpose of processing: To safeguard the public space and avoid undesirable and unsafe situations

2.3 Eindhoven

It emerges from the email correspondence that the City of Eindhoven would like to move towards a low-car city centre. To achieve this, the aim is to increase use of bicycles, public transport and walking, so as to make the city healthier and more pleasant. Eindhoven would like to minimize emissions of greenhouse gases (GHG), and electric shared mobility can play a part in this. The municipality would like information on the pressure that shared mobility places on the city's mobility system and parking facilities. It is also interested in the shared mobility adoption rate; the purpose of processing is unclear.

Policy-making on shared mobility

- **Type of analysis not stated**
- Policy question: *How can we encourage growth in sustainable shared mobility? What factors contribute to growth in shared mobility?*
- Purpose of processing: Encouraging shared mobility to achieve MaaS

- **Car reduction analysis and overall transport impact analysis**
- Policy question: *What pressure does shared mobility place on the mobility system? Is shared mobility replacing other modes of transport?*
- Purpose of processing: Information is needed as a basis for decisions on subsidies

- **Parking demand analysis**
- Policy question: *What demand for parking does shared mobility create?*
- Purpose of processing: not stated

- **Type of analysis not stated**
- Policy question: *What is the shared mobility adoption rate?*
- Purpose of processing: not stated

Planning and Enforcement – No information

2.4 Rotterdam

Rotterdam would like information on which target groups are using shared mobility. No reason is stated, but I assume this is to increase inclusion. The following data requirements are listed: distance covered per trip, use by area and distribution of use by day/week. The purpose of processing is unclear. Rotterdam is also interested in the connection between shared mobility and the greening of the public space. Why it is interested in this and what data is needed were not discussed.

Policy-making on shared mobility

- **User analysis**
- Policy question: *Which target groups are using shared mobility? In which districts is shared mobility being used?*
- Purpose of processing: To increase inclusion and accessibility

- **Car reduction analysis**
- Policy question: *Is shared mobility helping to clean up the fleet?*
- Purpose of processing: Information is needed as a basis for decisions on subsidies

- **Type of analysis not stated**
- Policy question: *Is there a connection between shared mobility and the greening of the public space?*
- Purpose of processing: not stated

Planning and Enforcement – No information

2.5 The Hague

The Hague has supplied a document setting out policy questions focusing on the topics of clean air, from ownership to use, efficient use of space, liveability, spatial impact, an integrated mobility system and inclusive mobility. These are highly relevant policy questions, but many of them require qualitative data, so these topics are not all included in the policy questions below. All the policy questions indicate that The Hague is not yet convinced that shared mobility is beneficial to air quality, safety, accessibility of the city, less use of private cars and an inclusive mobility system.

Policy-making on shared mobility

- **Car reduction analysis and overall transport impact analysis**
- Policy question: *What pressure does shared mobility place on the mobility system? Is shared mobility replacing other modes of transport?*
- Purpose of processing: Information is needed as a basis for decisions on subsidies

- **Use analysis**
- Policy question: *In which districts is shared mobility being used?*
- Purpose of processing: To increase inclusion and accessibility

- **Parking demand analysis**
- Policy question: *What demand for parking does shared mobility create?*
- Purpose of processing: not stated

- **Road safety analysis/accident analysis**
- Policy question: *What effect is the increase in shared mobility having on road safety?*
- Purpose of processing: To adapt the infrastructure and/or revise permit requirements

Planning – Safeguarding the quality of the public space

- **Use-based urban planning**
- Policy question: *Where in the city should parking areas be created?*
- Purpose of processing: To safeguard the quality of the public space and encourage shared mobility so as to achieve a clean, low-car city

- **Cluster and pavement management**
- Policy question: *At what places is shared mobility creating nuisance/unsafe situations in the public space?*
- Purpose of processing: To safeguard the quality of the public space and avoid undesirable and unsafe situations

Enforcement – No information

3 From policy needs to data

The survey reveals that some of the policy questions still need to be elaborated. The policy questions are visualized in the Excel file 'Survey of Policy Objectives', which shows the purpose of processing, type of analysis, request for data and associated data specification for each question. This clearly shows what aspects are still lacking in the arguments for some policy questions.

Availability data, i.e. data on parked vehicles, can be obtained from the TOMP-API, and trip data, aggregated data on start and end locations of trips, can be obtained from the CDS-M. The CDS-M also provides information on numbers of unique users.

Those policy questions for which full arguments have been given are shown in the table below. For a complete overview of the policy questions see the Excel file 'Survey of Policy Objectives'.

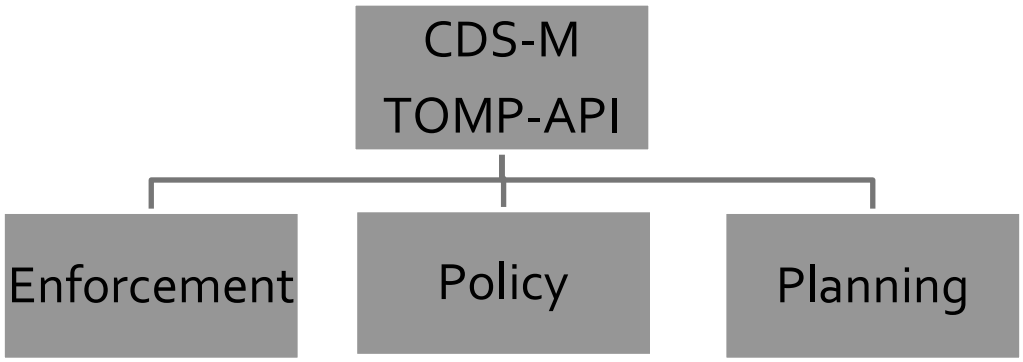
Policy questions	Purpose of processing	Analysis	CDS-M and TOMP-API data
Policy How are the existing parking areas being used? Which parking areas need to be enlarged/reduced/removed or made more visible?	Encouraging the use and findability of shared mobility	Parking Performance analysis	Ratio of parked vehicles to trips starting at parking area
What pressure does shared mobility place on the mobility system? Is shared mobility replacing other modes of transport?	Information is needed as a basis for decisions on subsidies	Car reduction and overall transport analysis	Average kilometres per trip and numbers of trips to destinations (shops, sports clubs, etc.) by public transport/car
In which districts is shared mobility being used?	Increasing inclusion	Use analysis	Number of parked vehicles or number of trips starting/ending by district

Planning – Safeguarding the public space Where in the city should the infrastructure be adapted to shared mobility?	Safety and throughflow	Use-based urban planning	Aggregated data on trip start and end locations
Where in the city should parking areas be created?	Encouraging shared mobility	Use-based urban planning	Aggregated data on trip start and end locations
At what places is shared mobility creating nuisance/unsafe situations in the public space?	To avoid undesirable and unsafe situations	Cluster and pavement management	Number of parked vehicles within x m^2
Enforcement How many vehicles does each operator have operating in the city?	Enforcing the permits	Fleet analysis	Number of unique users
Are vehicles being parked outside the permit area?	Enforcing the permits	Use analysis	Number of parked vehicles or number of trips starting/ending by district

Data obtained from the CDS-M and TOMP-API provides input in the areas of:

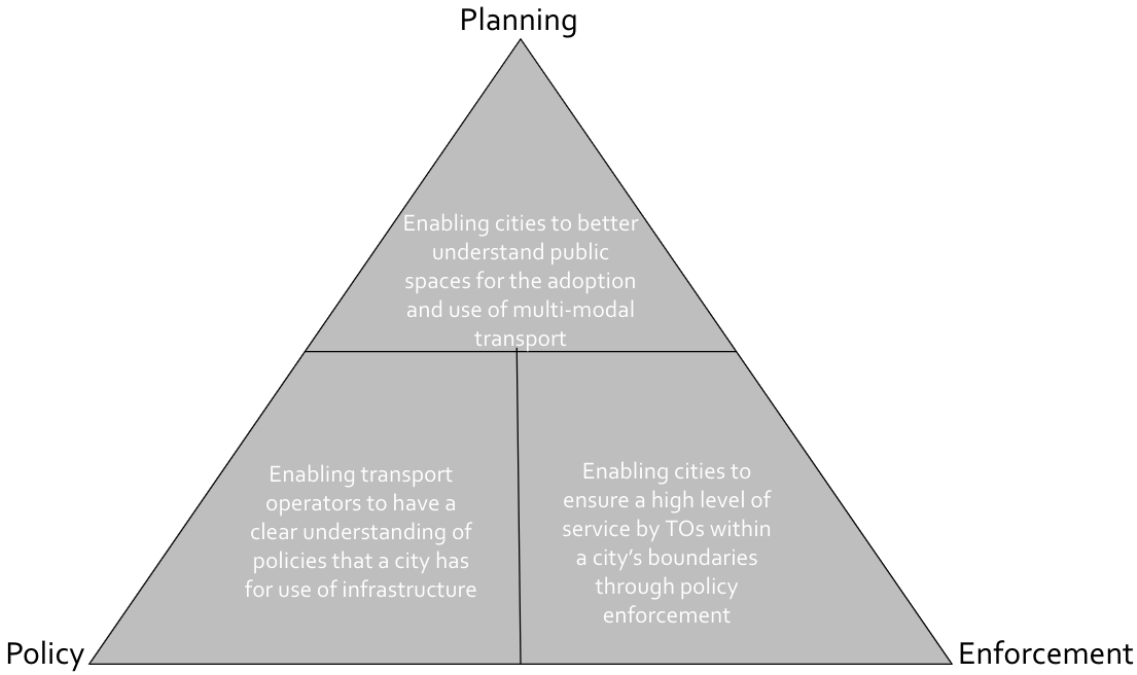
1. Policy
2. Planning
3. Enforcement

The following policy tree shows how this breaks down:



Policy tree of CDS-M public objectives

The policy tree can be developed for each 'pillar' as follows: purpose of processing > analysis > data request. This argument is needed not only to determine the metrics but also to write a PIA at the end of the day.



The three public objectives: policy, planning and enforcement.

4 From policy needs to results

Once the policy questions have been fully argued, it is important to create use cases that cover all three public objectives (policy, planning and enforcement). These use cases will serve as a tangible starting point for the discussions in the CDS-M working group. Several use cases will ensure that a broad 'standard' and 'agreement' can be developed to make the CDS-M suitable for all types of shared mobility.
The discussions on use cases will not take place at national level alone; Polis will facilitate further discussions, based on the results of internal research and the study by Guusje van der Vossen. The results will be presented to the Polis European Cities Network in March.

A sub-group of the pioneers in data and mobility will be set up, namely Amsterdam, Brussels, Paris, Lisbon, Helsinki and the International Transport Forum (ITF). These pioneers, in addition to the broad European consultations in Polis, will also collaborate on a smaller scale, in particular to share experience and knowledge of the design and implementation of data standards. In other words, knowledge of optimizing the 'standard', making use cases broader, data processing and storage will then be acquired through the national and European networks.

Two relevant use cases in the G5 are planned:
1. The Cargoroo use case in Utrecht
2. 'Check' in Amsterdam

'Cargoroo' is a company that provides shared electric carrier bikes and 'Check' provides electric scooters. The policy questions from the survey can be applied to both use cases. The dialogue with Cargoroo is already under way. The Cargoroo use case will be developed next month. Check approached Amsterdam last month: this discussion still needs to be pursued. Daan van der Tas (Lead of MaaS Amsterdam) hopes to create a two-part use case with Check and Felix. Felix is the second provider of shared electric scooters in Amsterdam.

An international definition of the use case with Cargoroo is set out under the following heading; this has not yet been possible for the early stage use case in Amsterdam.

5 The Cargoroo use case – Utrecht

Accessibility, inclusivity and the quality of the public space are the main policy objectives in Utrecht. Specifically regarding the use case with Cargoroo, Utrecht is interested in the extent to which shared electric carrier bikes will save on short car trips (to sports clubs, DIY stores, day care facilities, etc.). This links up with the following policy question > purpose of processing > analysis > data request:

What pressure does shared mobility place on the mobility system? Is shared mobility replacing other modes of transport?	Information is needed as a basis for decisions on subsidies	Car reduction and overall transport analysis	Average kilometres per trip and numbers of trips to destinations (shops, sports grounds, etc.) by public transport/car.

Utrecht has also said it would like to avoid clustering of carrier bikes in busy places. This need links up with the following policy question > purpose of processing > analysis > data request:

At what places is shared mobility creating nuisance/unsafe situations in the public space?	To avoid undesirable and unsafe situations	Cluster and pavement management	Number of parked vehicles within x m²

Utrecht would also like information on the distribution of carrier bikes and to increase their proximity. It would like information, for instance, on availability in less trendy districts such as Kanaleneiland, Overvecht and Leidsche Rijn to increase inclusion there if necessary. This need links up with the following policy question > purpose of processing > analysis > data request:

In which districts is shared mobility being used?	Increasing inclusion	Use analysis	Number of parked vehicles or number of trips starting/ending by district

Utrecht has also said it wishes to use the use case for agreement management, which links up with the following policy question > purpose of processing > analysis > data request:

Agreement management How many vehicles does each operator have operating in the city?	Enforcing the permits	Fleet analysis	Number of unique users
Are vehicles being parked outside the permit area?	Enforcing the permits	Use analysis	Number of parked vehicles or number of trips starting/ending by district

This is the outline of the Cargoroo use case in Utrecht so far. The plan is to develop it next month and link up more policy questions with it.

Amsterdam will go ahead with a use case as with Check and Felyx and the other G5 cities will put forward an additional use case this spring. The CDS-M working group would then have enough material to set to work, and substantial progress could be made towards a fully-fledged CDS-M with a mature 'standard' and 'agreement'.