1B.
Can data spaces accelerate the sustainable mobility pace?

09:00 AM - 10:30 AM

Traffic Efficiency

POLIS | ANNUAL CONFERENCE 2024
CITIES AND REGIONS FOR TRANSPORT INNOVATION

27-28 NOVEMBER 2024

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Strategic context

EMDS initiative of the EC

[Communication from the Commission (Nov. 2023)](#)

Initiatives under EMDS

Policy basis:

Data Strategy and
Smart & Sustainable Mobility
Strategy

|

[PrepDSpace4Mobility](#) (2022-2023)

|

[deployEMDS](#) (2023-2026)

|

CEF-funded EMDS study
(interlinking layer and governance
options) (2024)

|

Action for deployment of the
interlinking layer (2025, upcoming)
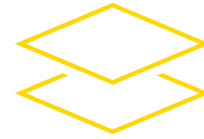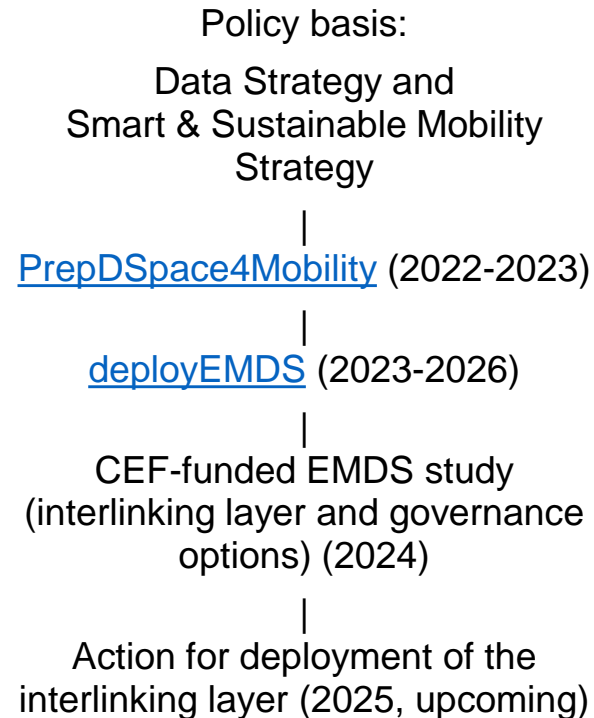
Strategic framing of the EMDS initiative

High-level EC objective: facilitating
access, pooling and sharing of data
from existing and future transport
and mobility data sources

Creation of the common EMDS is a
longer-term initiative involving
many different stakeholders from
mobility & logistics domains,
including the yet to be established
EDIC

[deployEMDS](#) focuses on **realising
use cases** and **piloting state-of-
the-art data space approaches** at
local and regional level

Decentralisation as a key principle

The EMDS will not be...

- one vast centralised database that will host all of the EU's mobility data
- a fully-fledged data space like the German Mobility Data Space or Eona-X (with membership and possibly participation fees)

The EMDS will be...

- a **common framework** for interlinking and federating many different existing mobility data ecosystems and include:
  - an 'interlinking layer' (facilitating **discoverability** through a federated metadata catalogue)
  - common building blocks (described as part of a **future reference architecture**)
  - recommended **standards** (to promote convergence and enable interoperability)
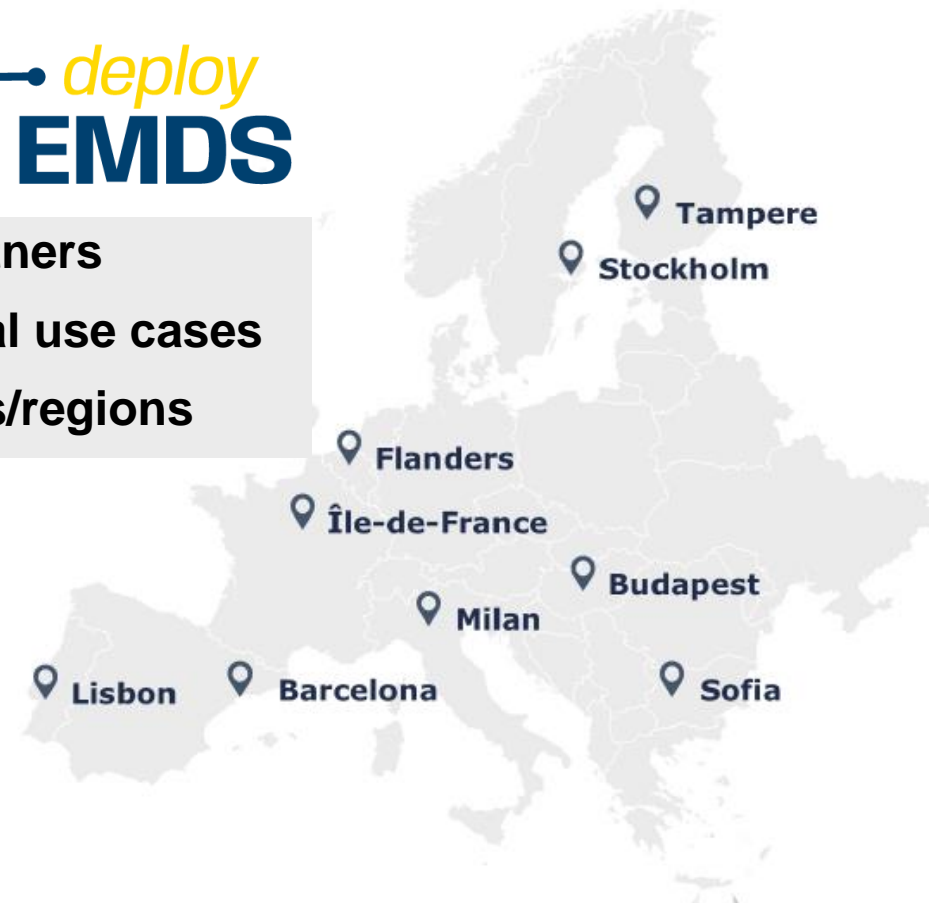
The project

36-month deployment action

Budget: ~16 EUR million

50% funded by EC

Nov. 2023

2024

2025

2026

Oct. 2026

We are here

deploy
EMDS
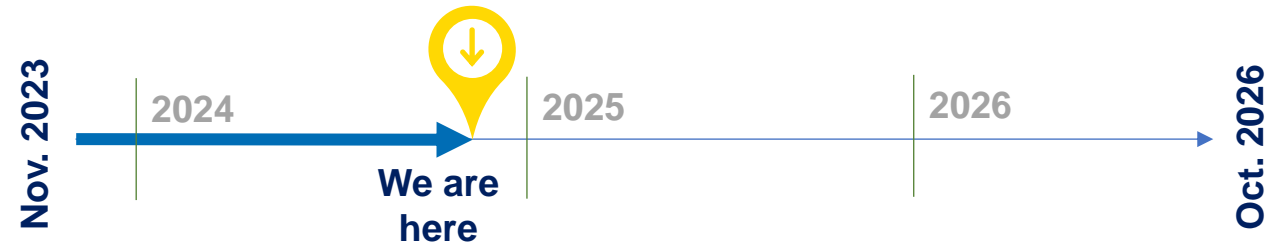
- **45 partners**
- **16 local use cases**
- **9 cities/regions**

Tampere

Stockholm

Flanders

Île-de-France

Budapest

Milan

Lisbon

Barcelona

Sofia

16 use cases in 9 cities & regions

Mobilising Europe through interlinked data sharing ecosystems

Flanders

Sofia

Barcelona
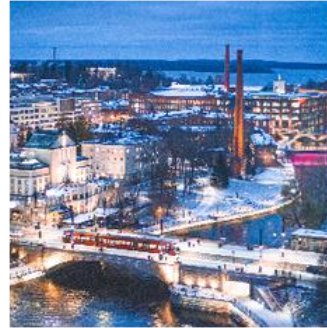
Tampere

Île-de-France region

Budapest

Milan

Lisbon

Stockholm

Focus:

- multi-modal travel information
- real-time traffic information
- Urban Mobility Indicators

deployEMDS.eu/ deployment/

Data sharing and access: common challenges

Legal and regulatory challenges

- Navigating complex and fragmented **regulatory frameworks** across different jurisdictions

- **Legal uncertainty around what data can be shared**, with whom, and how (privacy, trade secrets, data sovereignty)

- Insufficient good practice examples and **standard templates** for efficient and compliant data sharing with other actors

Business and organisational challenges

- **Lack of awareness** of strategic value of data

- Underdeveloped data sharing culture (**silo mentality** and fragmented data management)

- **Capacity constraints** (limited competences and specialised skills to leverage data)

- **Inadequate data governance** practices and lack of streamlined processes, resulting in high data acquisition and transaction costs

- **Reluctance to share** data due to trust, reputation, unclear ROI or competition concerns

- **Missing good practices** for cross-border, cross-organisational data sharing in mobility

Technical challenges

- Fragmented data landscapes and missing ability to search across datasets, limiting **discoverability**

- **Lack of interoperability** and standard protocols, making it difficult and costly to exchange, understand and use data

- Outdated, proprietary and often incompatible **IT systems**

- Still emergent and dynamically **evolving data space technology** landscape, creating uncertainty and delaying adoption

- Poor and **inconsistent data quality**, and lack of tools to assess quality

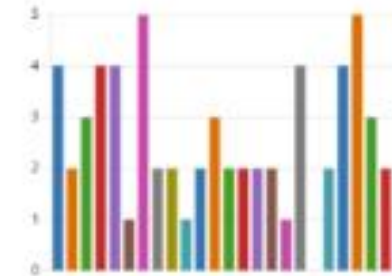# Zoom in: organisational governance (1)

- Survey with cities/regions participating in deployEMDS, conducted by RISE
- 5 out of 6 experience challenges with organising data sharing and face limited capabilities for data management
- 4 out of 6 are affected by
  - Slow digital transformation
  - Lack of tools or expertise to mitigate trust issues in data cooperations
  - Opacity on data contracts
  - Unwillingness to share data of public interest
  - Insufficient financial resources

1. Please select all the organisational governance challenges from the list below that you experience or are affected by:
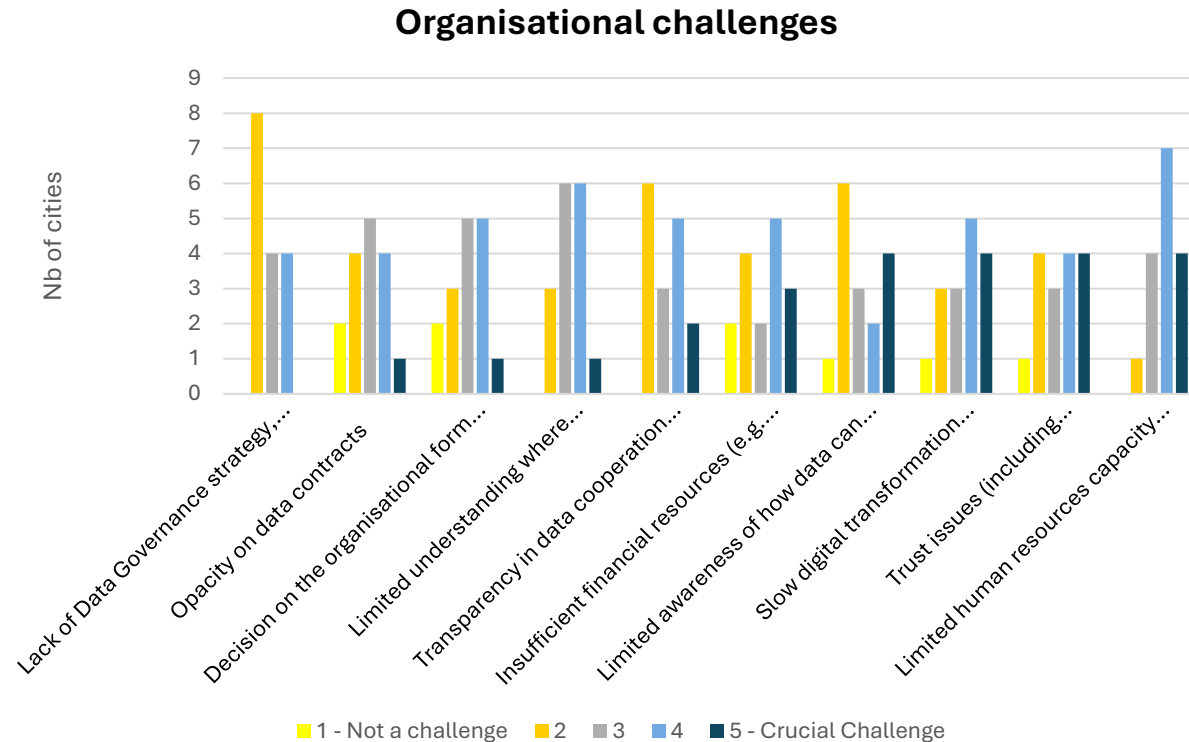
Explanation in survey: *Here we would like to hear your opinion about organisational challenges related to the governing of data sharing, e.g. transparency, accountability, oversight/monitoring, representation of participants in data governance bodies and their ability to contribute to the decision-making processes, enforcement, etc.*

Zoom in: organisational governance (2)

Organisational challenges

Nb of cities

9, 8, 7, 6, 5, 4, 3, 2, 1, 0

Categories (x-axis, left to right):
- Lack of Data Governance strategy,...
- Opacity on data contracts
- Decision on the organisational form...
- Limited understanding where...
- Transparency in data cooperation...
- Insufficient financial resources (e.g...
- Limited awareness of how data can...
- Slow digital transformation...
- Trust issues (including...
- Limited human resources capacity...

Legend:
- 1 - Not a challenge
- 2
- 3
- 4
- 5 - Crucial Challenge

- Survey with cities/regions outside of deployEMDS (Network of Follower Cities), conducted by POLIS
- Challenges (ranked high to low):
  - Limited human resources capacity for data management and use (lack of skills and specialised expertise)
  - Trust issues (including unwillingness to share data of public interest, understanding how to build trust and mitigate trust issues among actors involved in data cooperation)
  - Slow digital transformation (resistance to change)
  - Limited awareness of how data can be used to to address mobility-related challenges (including lack of data-driven organisational culture)
  - Insufficient financial resources (e.g. due to high costs related to collecting and processing or distributing and sharing data)
  - Transparency in data cooperation (challenges might revolve around inadequate information on what data is provided or received, for what purpose and for what duration, etc.; policies, rules and standards
  - Limited understanding where relevant data can be found and how to access it
  - Decision on the organisational form (or legal form), the creation of a data space governance framework & the governance authority
  - Opacity on data contracts
  - Lack of Data Governance strategy, systems and standards for managing data quality, access, use, privacy, security, etc.

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Why develop such data spaces jointly?

- Idea: **digital infrastructure layer on top of physical infrastructure.**

- **Compliance, security & efficiency**: importance of a well-defined data governance framework for regulating data management and usage, e.g. looking towards digital twins or integration of vast amounts of data from diverse sources.

- **"Data economy" means building trust and legal certainty** around non-open data (privacy, commercial sensitivity, usage access control).

- **Data space concept** can facilitate complex, multi-stakeholder data sharing and addressing discoverability and integration challenges across various departments and entities. It also addresses trust between stakeholders and additional safeguards to ensure sovereignty are needed.

- **Using open-source digital infrastructure** to avoid lock-in and high operational costs in combination with the use of open standards.

- **Win-win/joint investment**: No need to reinvent the wheel → pooling learnings and common investments → use blueprint for local/regional data infrastructure.

- **Readiness for future interoperability**: Easily integrating data from another data ecosystem/platform/data space, e.g. to better integrate multimodal mobility between two major European cities or address traffic congestion in border regions.
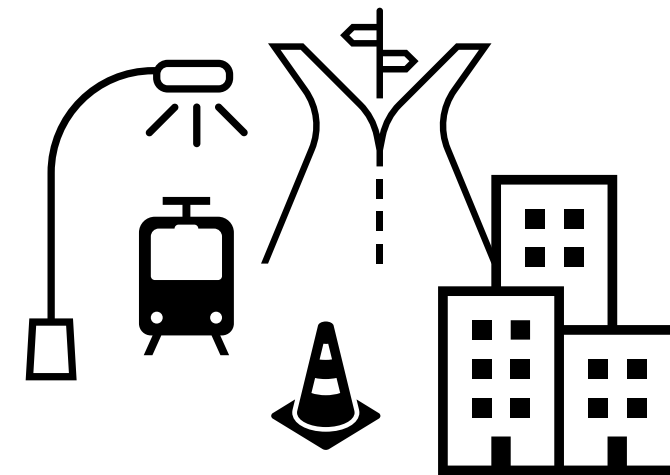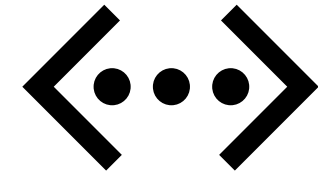
Strategic perspectives on EMDS

01 To enable harmonisation and seamless data sharing across Europe, the EMDS framework will consist of a **federated network of interoperable mobility data spaces developed in local nodes** (city/region) – and other mobility subsectors like aviation, rail, logistics.

02 A set of **technical infrastructure components need to be common** across all local data spaces to ensure interoperability under the EMDS framework. These would be developed centrally and made available for local implementation or, where not needed, developed locally following a reference architecture/mandatory protocols.

03 The EMDS framework must align EU harmonisation goals with **tangible benefits** for local parties and industry actors and develop a **compelling long-term vision** to convince all relevant stakeholders that participation is a worthwhile and sustainable investment.

04 **Transversal use cases** are essential to demonstrate the **value of interoperability** enabled by the EMDS framework.

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What's next?

Testbed and **technical specifications** forthcoming (Jan 2025)

Overview of existing **regulatory frameworks** and **governance mechanisms** for mobility data sharing and their applicability (Feb 2025)

Legal tools for compliant/trusted data sharing (task starting)

Parallel initiative/project by and for Member States co-investing in digital infrastructure: **EDIC Mobility & Logistics Data** (starts Feb 2025)

Co-shape transversal European use cases

Join a broader network of cities working on data governance
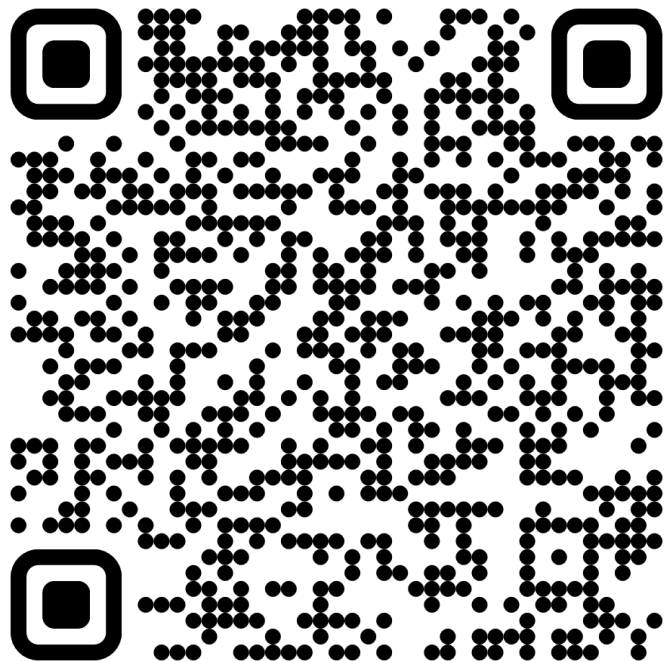
Access use case descriptions and requirements analysis

Thank you for your attention!

For more information:

Lucie Kirstein

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Introduction to the city of Mechelen

- Almost 90.000 inhabitants

- Young population, vibrant city center

- Ambition to be a smart city, but current lack of extensive data
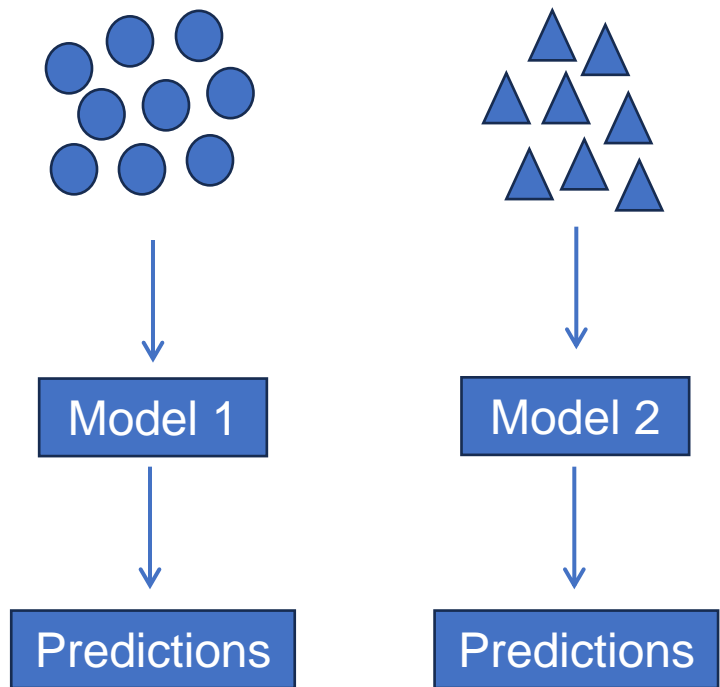
- Mechelen = SMC, as most cities in the world
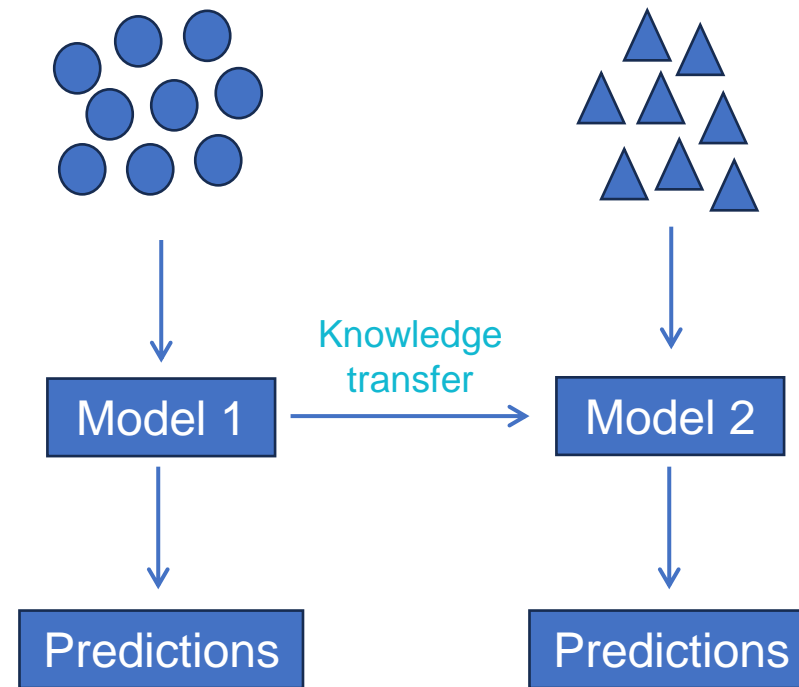
Transfer learning
to the rescue

Transfer learning
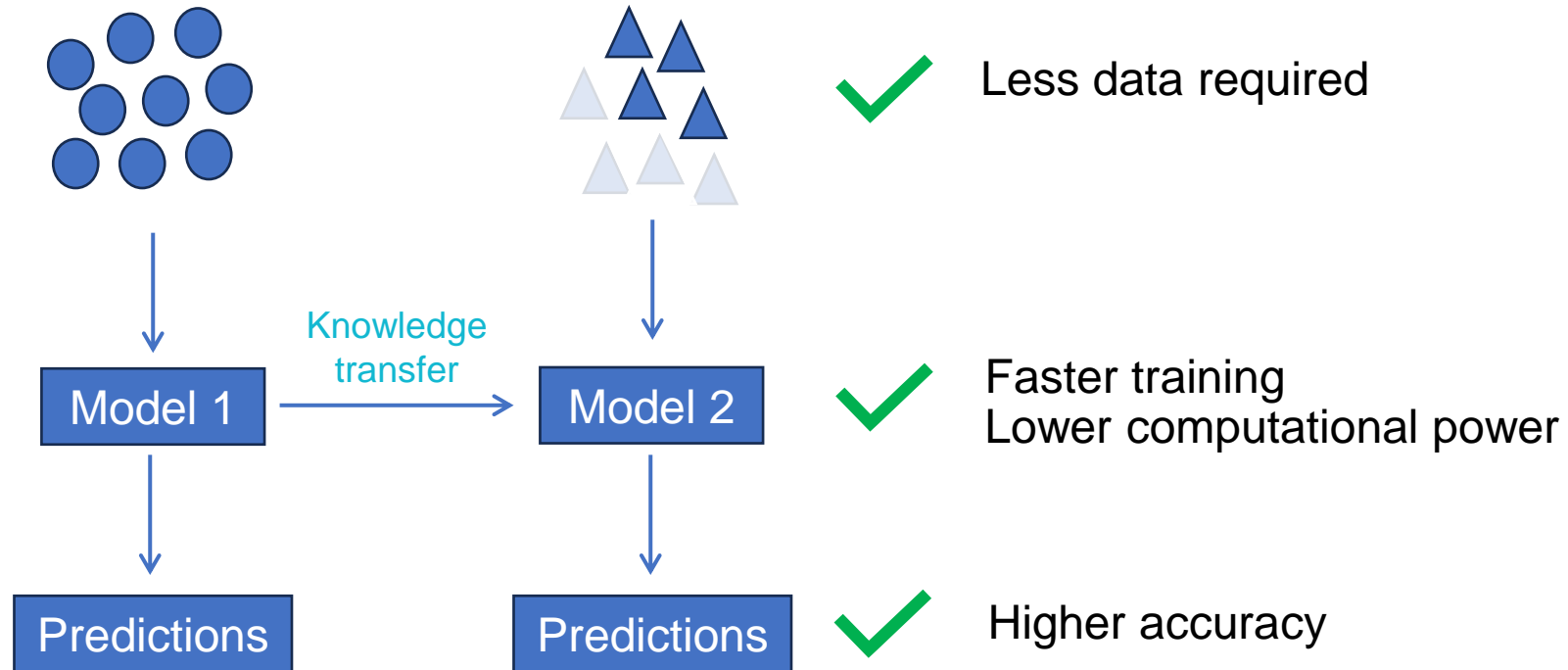
Traditional machine learning

Transfer learning

Model 1

Model 2

Knowledge transfer

Model 1

Model 2

Predictions

Predictions
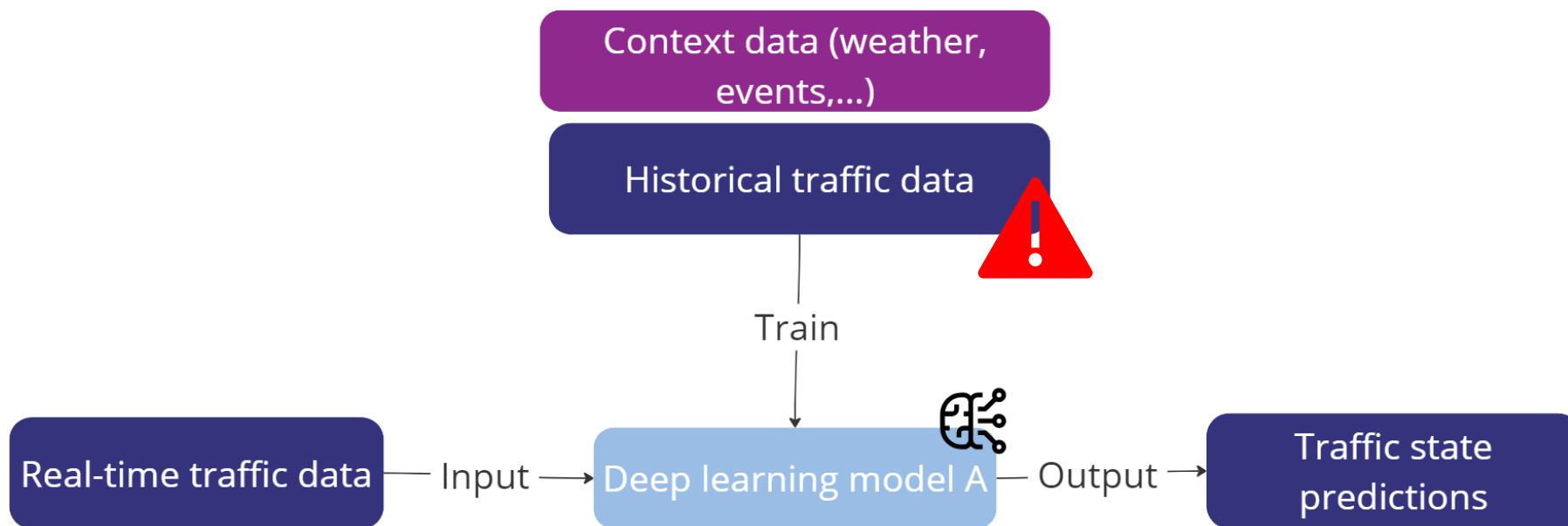
Predictions

Predictions

Transfer learning

Transfer learning

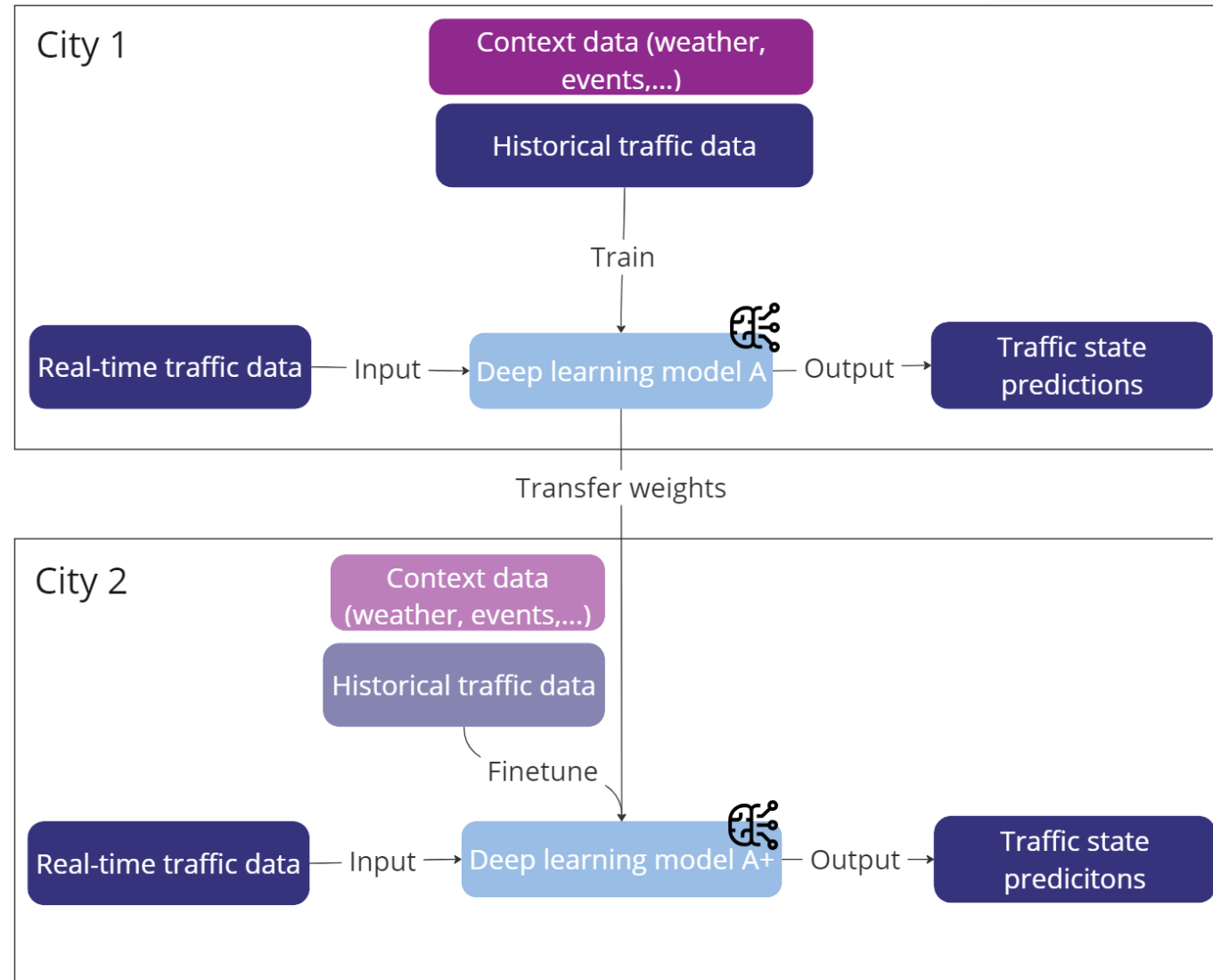# Transfer learning

Transfer learning

Transfer learning

	CLASSIC MACHINE LEARNING	TRANSFER LEARNING
Data	9 months of Manchester	3 months of Los Angeles + 23 days of Manchester
Mean absolute error	3.138 km/h	3.194 km/h

Data spaces to the rescue

Data spaces

Sensor provider 1

Sensor provider 2

Sensor provider 3

Timestamp	count
2023-06-22 00:15:00+02:00	3.82
2023-06-22 00:30:00+02:00	6.31
2023-06-22 00:45:00+02:00	1.05
2023-06-22 01:00:00+02:00	1.47
2023-06-22 01:15:00+02:00	8.53

Timestamp	bicycle	person	vehicle
2023-12-01 10:17:20	0	0	0
2023-12-01 10:17:25	0	0	0
2023-12-01 10:17:30	0	0	0
2023-12-01 10:17:35	0	0	0
2023-12-01 10:17:40	0	0	0

timestamp	bus	car	cyclist	motorcyclist	pedestrian	truck
2023-12-01 10:24:00+00:00	0	0	0	0	0	0
2023-12-01 10:24:30+00:00	0	0	0	0	0	0
2023-12-01 10:25:00+00:00	0	0	0	0	2	0
2023-12-01 10:25:30+00:00	0	0	0	0	0	0
2023-12-01 10:26:00+00:00	0	0	0	0	0	0

Data spaces

Toon me alle observaties met fietsers tussen 8 en 12 uur 's ochtends.
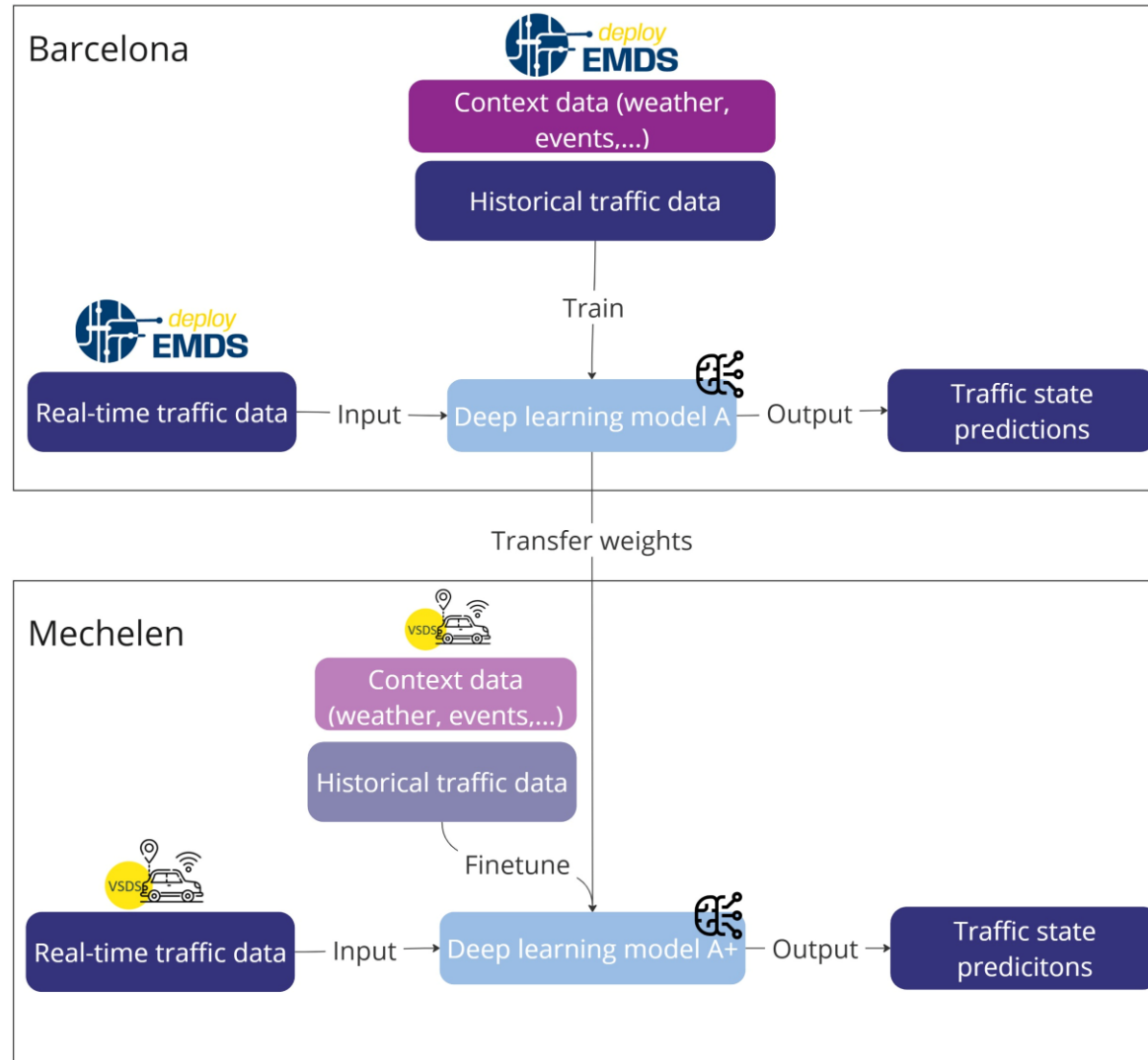
Go! | Clear
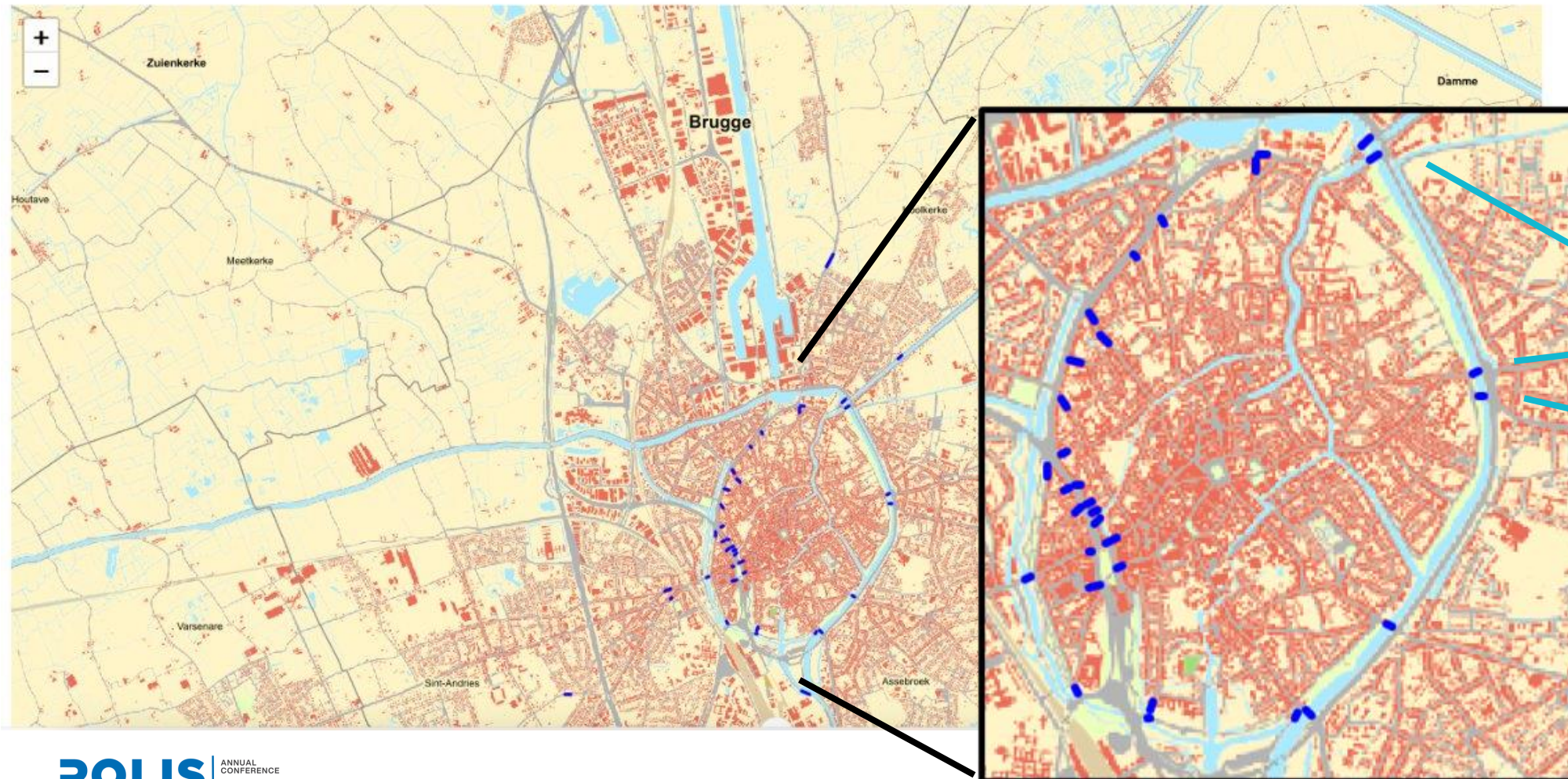
Sensor provider 1

Sensor provider 2

Sensor provider 3

Data spaces

Potential use for Mechelen

Dynamic
parking guiding
system
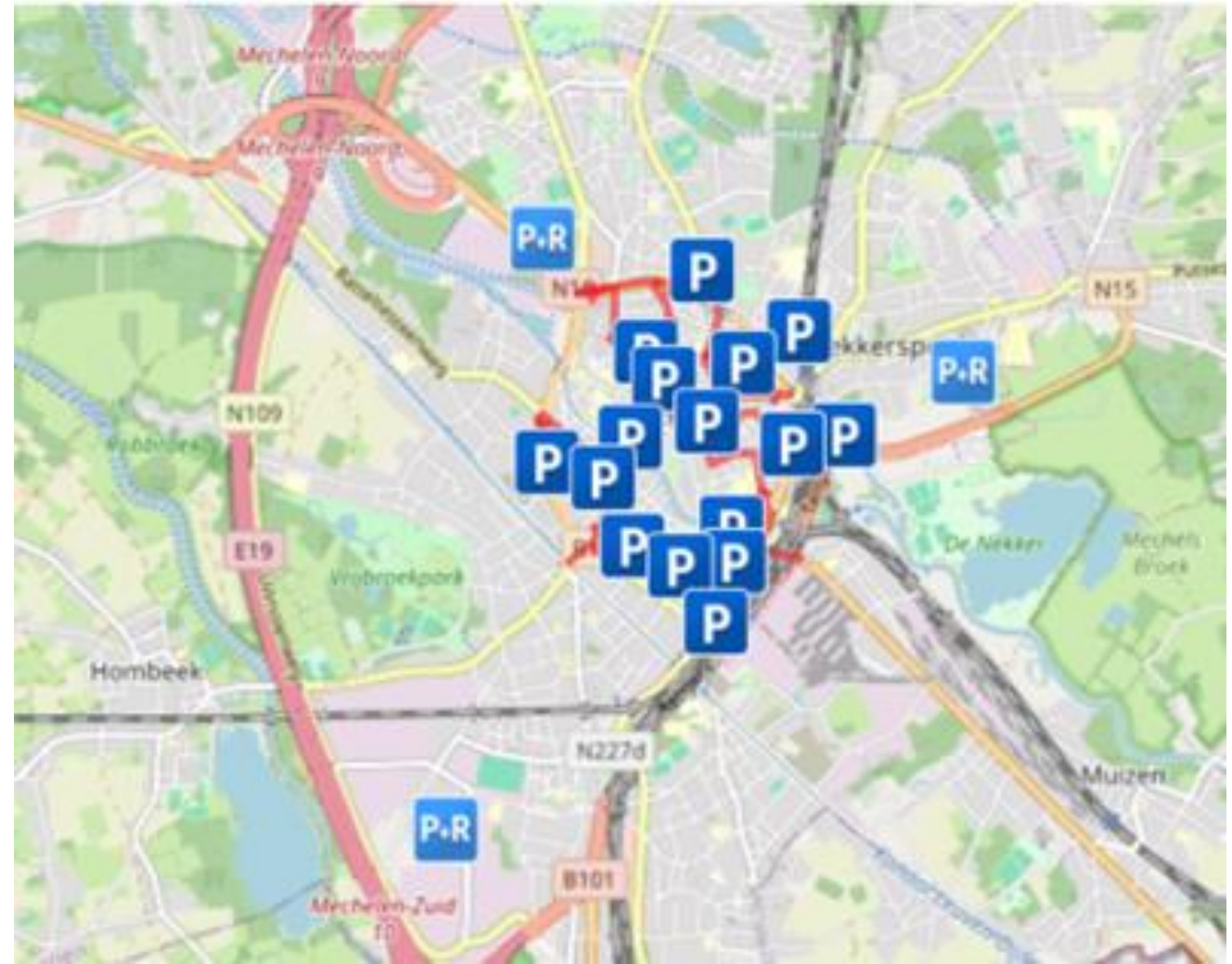
Thank you for your attention!

For more information:

Laure.DeCock@imec.be
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Shaping sustainable mobility
with new data platforms

Dr. Jochen Harding
Managing Director
NRW.Mobidrom GmbH

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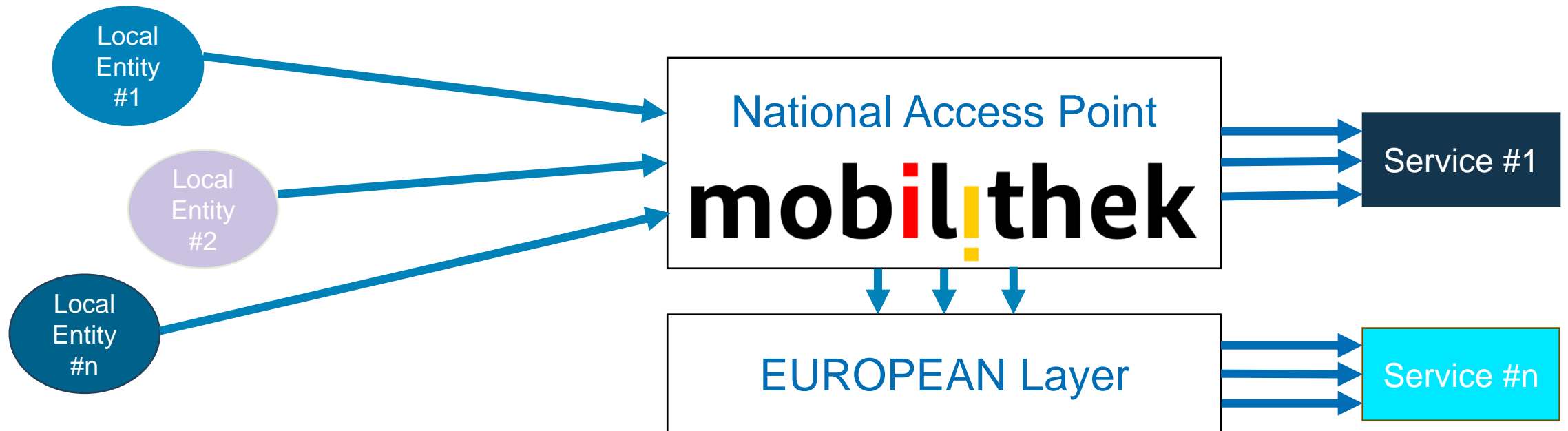# Data – the key for sustainable mobility

Challenges and Needs

Technical requirements? Help available? Encouraging use of my data?

Local Entity #1

Local Entity #2

Local Entity #n

National Access Point

mobilithek

EUROPEAN Layer

Service #1

Service #n

Relevant sources?
How to integrate?
Handling data quality?

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State layer - Agencies & platforms: tasks & benefits

Local support
Transformation & Pooling
Quality assurance

Local Entity #1

Local Entity #2

Local Entity #n

State Layer

Datenplattform

National Access Point

mobil:thek

EUROPEAN Layer

Service #1

Service #n
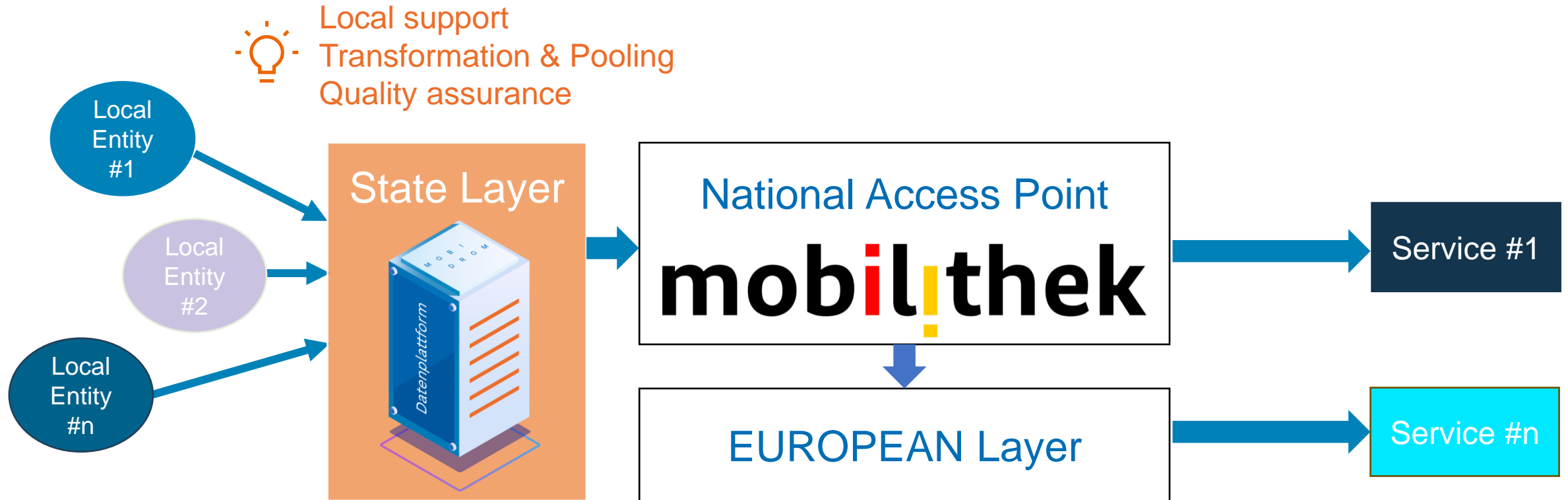
Who we are

Mobidrom – Partner for mobility data in NRW

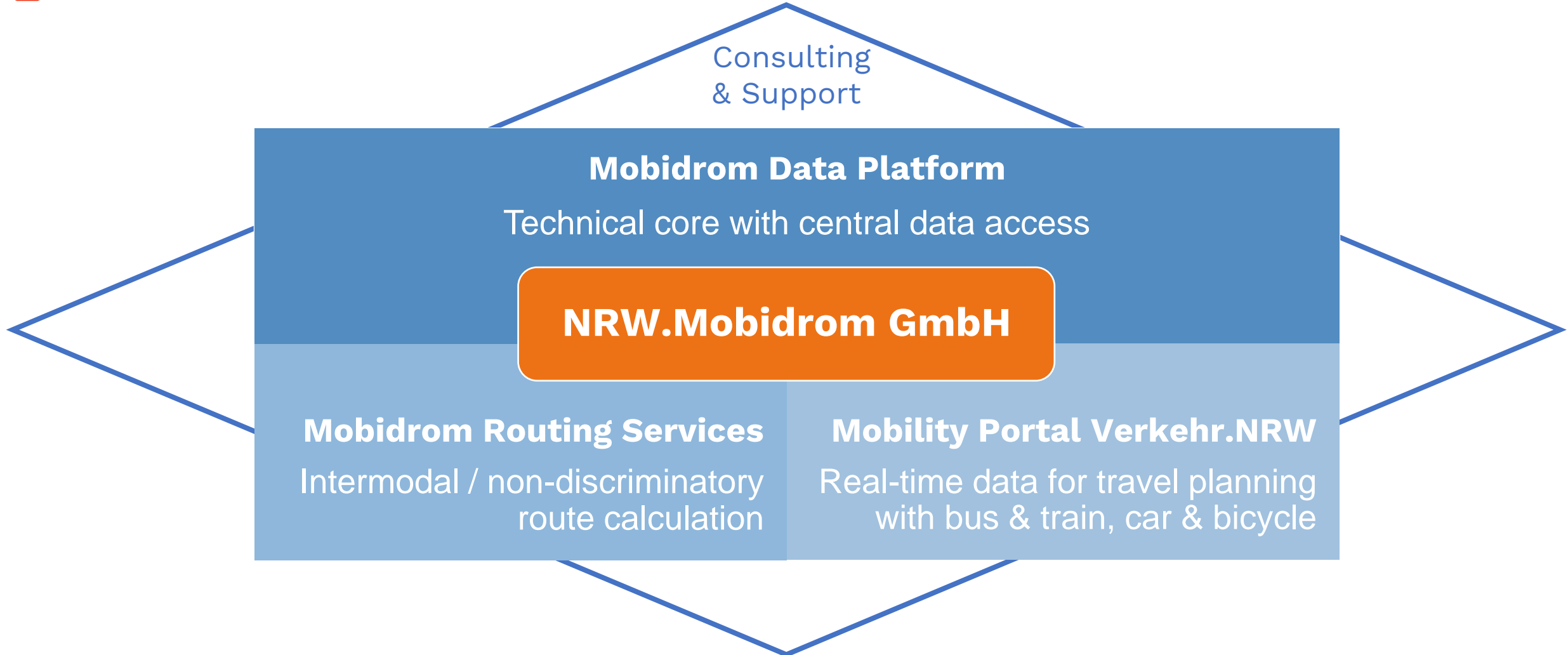- founded in 2023 by the State of North Rhine-Westphalia (NRW), Germany

- implementation unit for mobility data supporting digital and connected mobility

- our mission: to create the technical and organizational conditions for the connected and sustainable mobility of tomorrow

- state-funded, neutral and agile

- our aim: to make intermodal and climate-friendly travelling easier

Mobidrom – Products & Services

Consulting & Support

Mobidrom Data Platform

Technical core with central data access

NRW.Mobidrom GmbH

Mobidrom Routing Services

Intermodal / non-discriminatory route calculation

Mobility Portal Verkehr.NRW

Real-time data for travel planning with bus & train, car & bicycle

Example: Routing services API

How can I show citizens or customers customized routes with real-time information in my app or on my website?

Routing services API

Range of services: Easy-to-integrate interfaces (APIs)

- replaces time-consuming data integration and complex system extensions

- transparency and sustainability thanks to established open source components

- responding to route requests with intermodal door-to-door connections

transformation addresses ↔ geolocation

intermodal routing
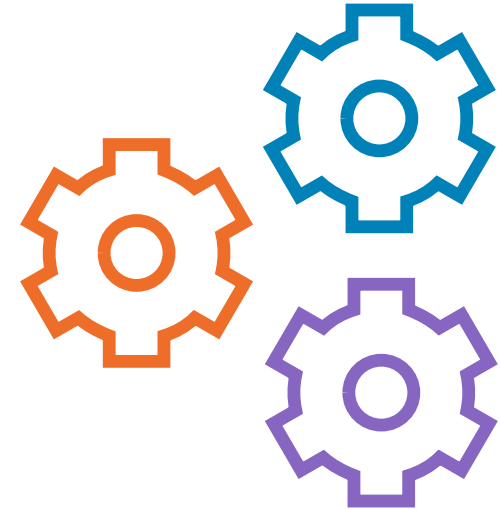
provision of tiles for map display

For more information:

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www.mobidrom.nrw

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Transforming mobility by open data

- Enhancing **multimodal mobility** offers

- Making **alternatives** to motorized private transport **more attractive**

- **Tailored mobility information** to specific mobility requirements

- **Shared and connected mobility** through open data

Our goal: transforming the transport sector by 2030

Double the use of public transport

One in two cars is powered by renewable energy

−55% CO$_2$ *
*compared to 1990

Half of all freight is transported by climate-neutral means

One fifth less car traffic in cities and rural areas

One in two trips is done walking or by bike
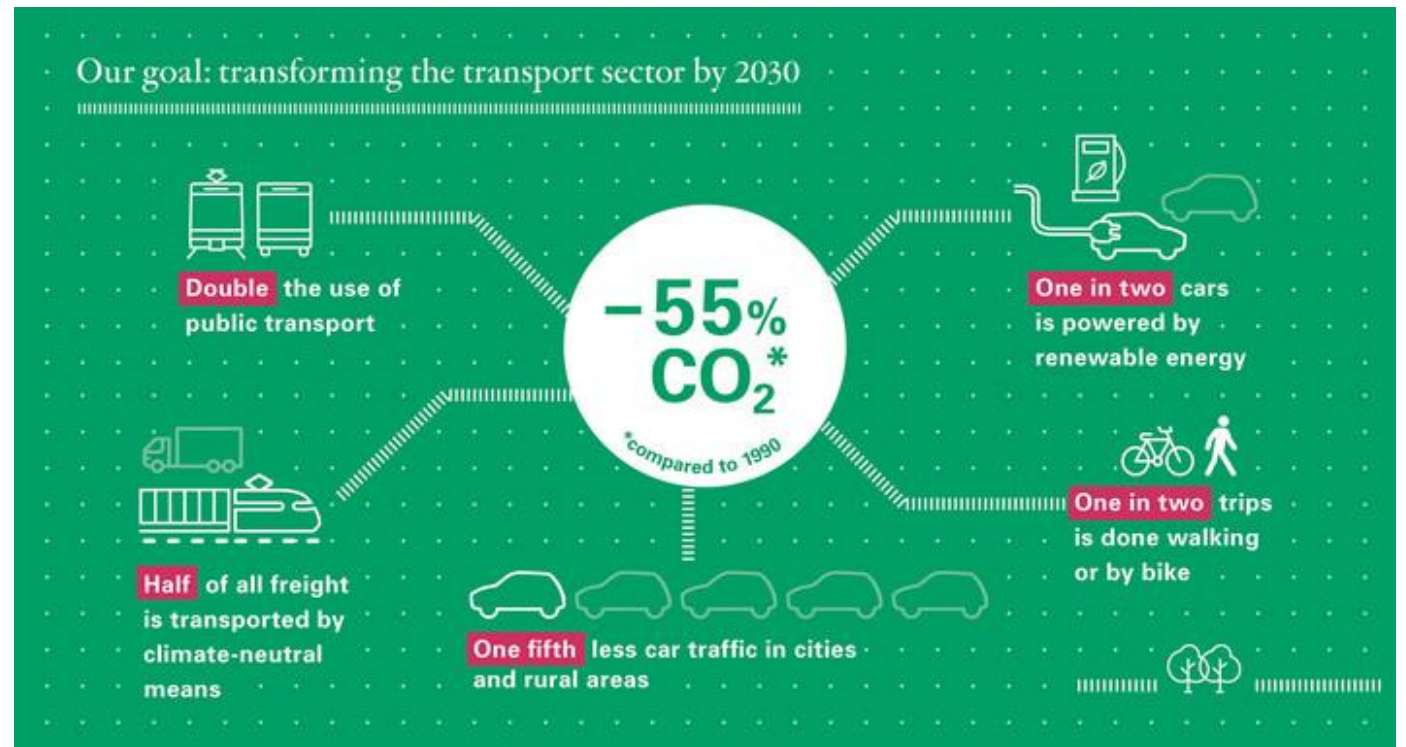
Multimodal mobility = many partners

Bild: Stadtwerke Konstanz — Departure?

Bild: SSB AG — How to order?

Bild: Bosch eBike Systems — How safe?

Bild: QIMBY CCO 1.0 — Accessibility?

…and an enormous amount of data

Bild: NVBW — On-time?

Bild: Robert Bosch GmbH — Where to park?

Bild: ENBW AG — Free in 30 min.?

Bild: stadtmobil — Available?

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Multimodal mobility = many partners

MOBIDATA BW / NEUE MOBILITÄT

Mobility Data Platform of Baden-Württemberg

Bild: Stadtwerke Konstanz

Departur...

Bild: NVBW

On-time?

...in 30 min.?

Accessibility?

Bild: stadtmo...

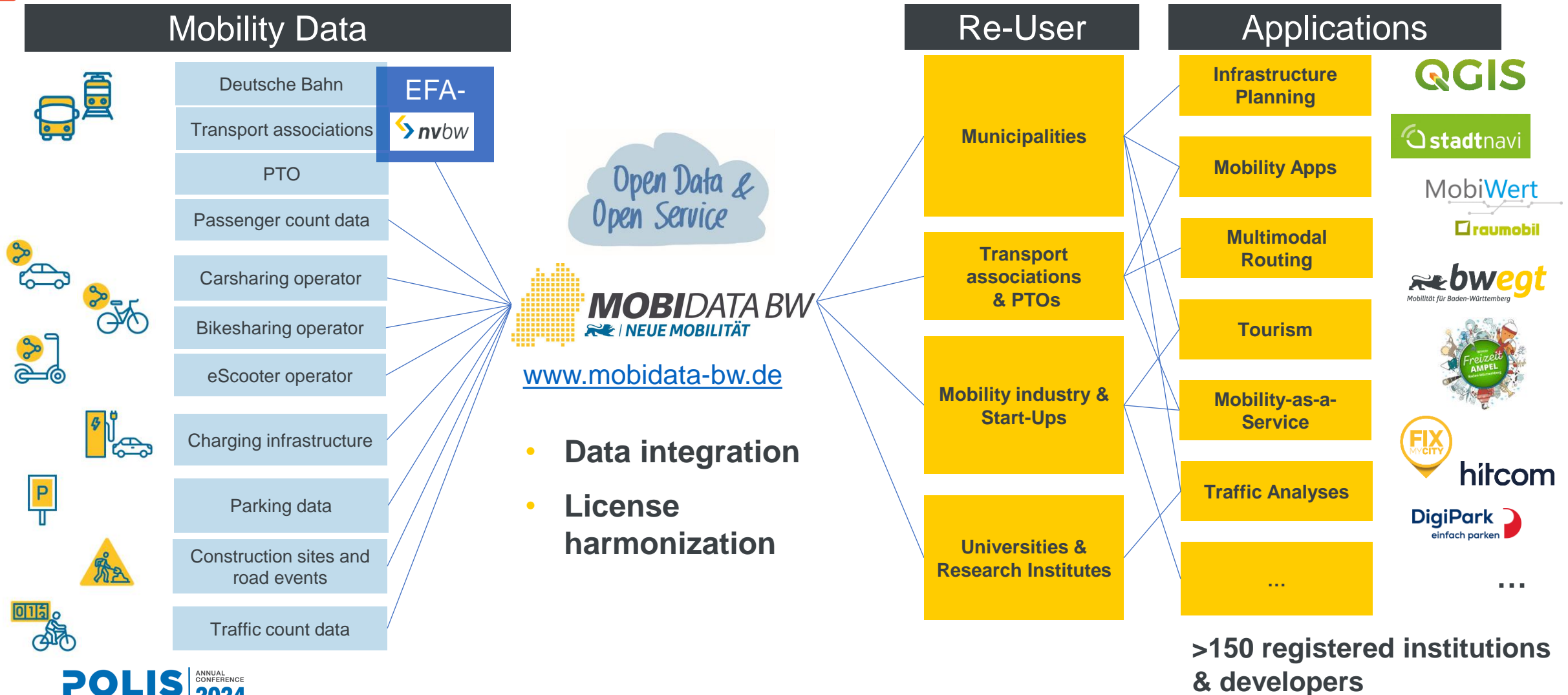POLIS ANNUAL CONFERENCE 2024
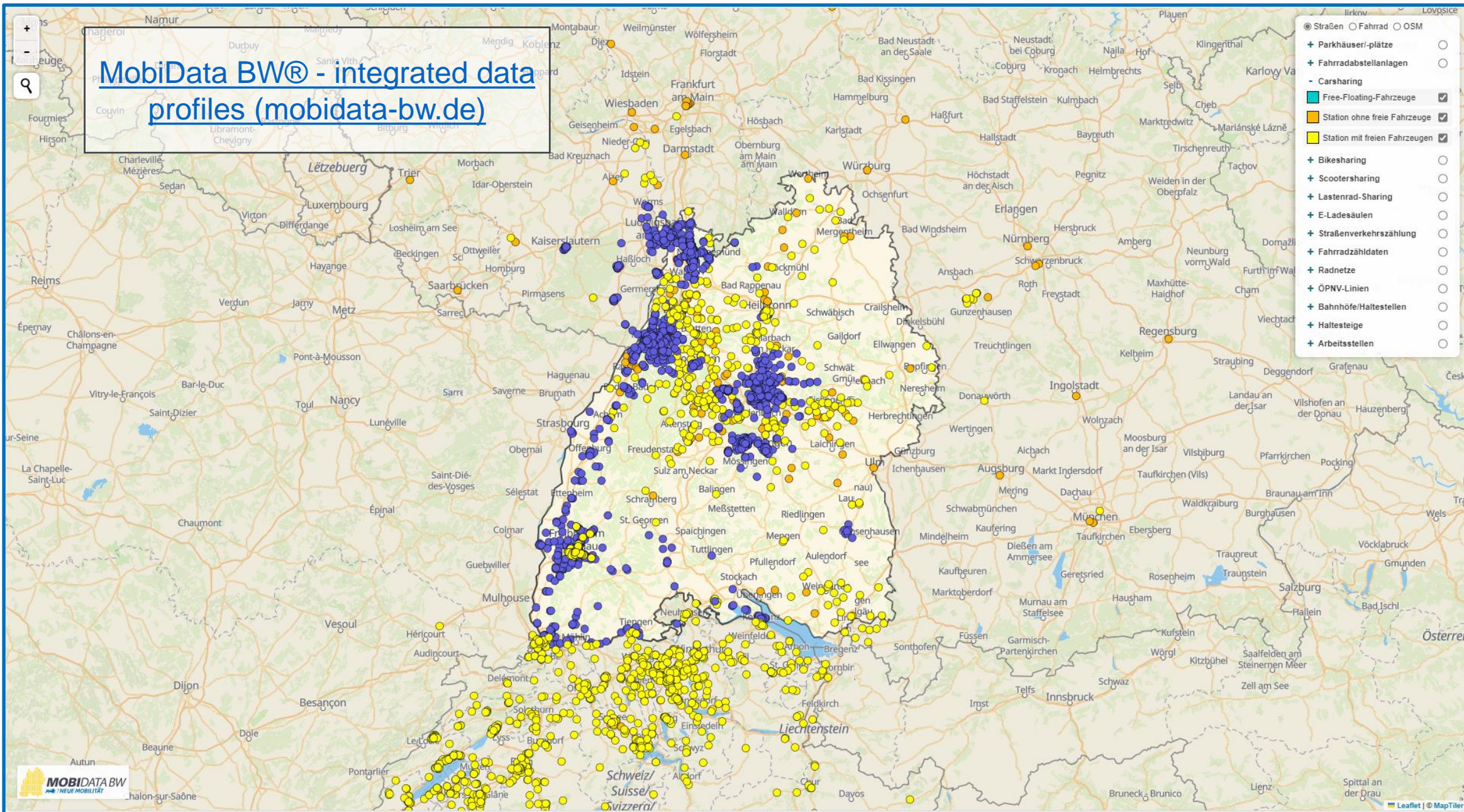CITIES AND REGIONS FOR TRANSPORT INNOVATION
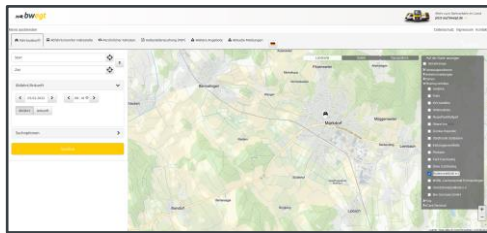
Data Integration and Open Access

MobiData BW® - integrated data profiles (mobidata-bw.de)
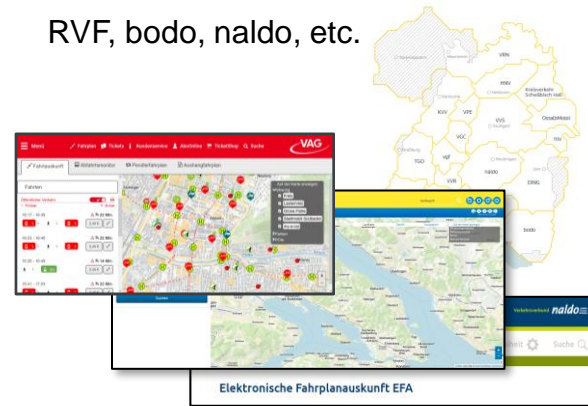
Resulting solutions?

Multimodal Routing
(bwegt)

State-wide mobility information

Source: bwegt.de
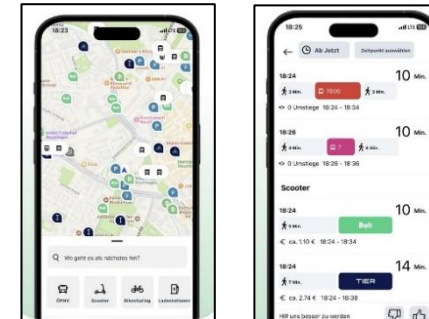
Schedule Information from local transport associations

RVF, bodo, naldo, etc.

Mobility-as-a-Service

Example: Arrive Mobility in Reutlingen

Source: https://www.arrive-mobility.com/

Mobility Analyses

Example: Bicycle-Counter Analysis by Databundles UG

Source: https://bike-app-5mlqyiifqa-ey.a.run.app/
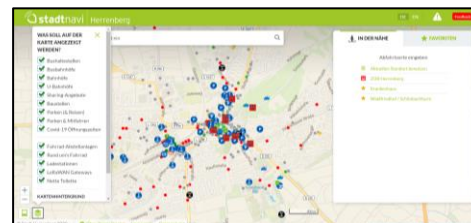
Digital city maps and regional mobility services

Examples: SmartMobilityMap Neckarsulm
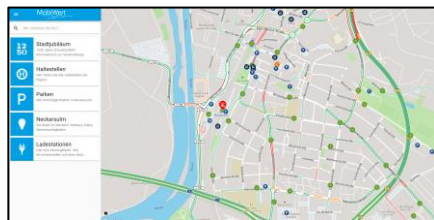
Source: mobiwert.smartmobilitymap.de

StadtNavi Herrenberg
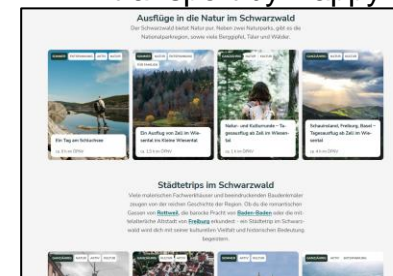

Source: stadtnavi.de

Tourism

Example: Vacation planning with public transport by Happy Trips

Source: https://www.happy-trips.de/region/schwarzwald

>150 registered users of MobiData BW APIs

Call to action for cities & regions: Need for more data and better data quality

Existing data sharing obligation

ITS-Directive 2010/40/EU and Delegated Acts

- Commission Delegated Regulation (EU) 2024/490
- Commission Delegated Regulation (EU) 2022/670
- Commission Delegated Regulation (EU) 885/2013
- Commission Delegated Regulation (EU) 886/2013
- Commission Delegated Regulation (EU) 2023/1804

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For more information:

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Wilhelmsplatz 11 | 70182 Stuttgart

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Use Case Team

i2cat[R]	**Research Institute** • Technical experts in Data Spaces • European research context
ATM Àrea de Barcelona Autoritat del Transport Metropolità	**Transport Authority** • Public Transport coordination • Planning
NOMMON	**Data Product Provider** • Data analytics in transport sector • Prediction & optimisation

With the collaboration of…

Sagalés	**Public Transport Operator** • Operator of several PT routes • Field knowledge

Use Case Objectives

- Demonstrate local (but scalable) solutions enabled by **data spaces** for more **sustainable and efficient transport systems** in cities, contributing to a common EMDS framework through strategic alignment across local use cases.

- Specifically for Barcelona, demonstrate solutions of a **multi-operator data governance ecosystem** for **bus** and **Demand-Responsive Transport** (DRT). Enable parts to share data in a fair, traceable manner to allow for optimal multimodal integration of public transportation services.

🚌	**Fixed-schedule Bus** • Regular bus service
🚌	**DOT (Demand-Oriented Transport)** • 'Skippable' stops/runs
🚌	**DRT (Demand-Responsive Transport)** • Connect stops according to requests

Multi-operator data governance ecosystem

PTOs with DRT offerings use new data to refine their user-facing services (e.g. requests services)

PTA and PTO use decision-support data for planning and optimising routes between different modes

PTO bus fleet operators
(various modes: regular, ODT, DRT)

Data transmited from individual buses, PTOs use SAEi system to manage data (SAEi not a data intermediary)

New insights & decision-making data

Data consuming services, generating new data and insights

PTOs data usage control interfaces

SAEi system
(operated by local PTA, provided to PTOs)

NOMMON
Nommon analytics and decision-support tools

deployEMDS common data space services (TBC) deployment

ATM Àrea de Barcelona
Autoritat del Transport Metropolità

ATM Barcelona Metropolitan Transport Authority (PTA)

Bus data generated from PTOs using SAEi system

Bus tracking and monitoring data

Identity Provider / Autority

Metadata Catalogue

PTOs' DRT/ODT platforms, services and data for travelers

Ticketing data

PTA provides consolidated ticket validation data

Data Governance (Compliance Rules, Usage Policies, etc.)

Common Vocabularies (Ontologies, Models)

Third-party mobility apps and services

Regional gov / municipalities

Govs manage open data portals

Complimentary open data

i2cat®

Mobile Network Operator
(via Nommon)

Mobile network data (MND)

MNO provides anonymised cellular data to detect mobility patterns

eit Urban Mobility

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Sub-Use Cases

Sub-Use Case 1 (bus to DOT)

- DOT (Demand-Oriented Transport): fixed schedules but with some skippable stops/expeditions if no trip requests are registered.

- Target variables (optimisation):
  - Δt
  - Δd
  - $\Delta t * passengers$?
  - $\Delta d * passengers$?
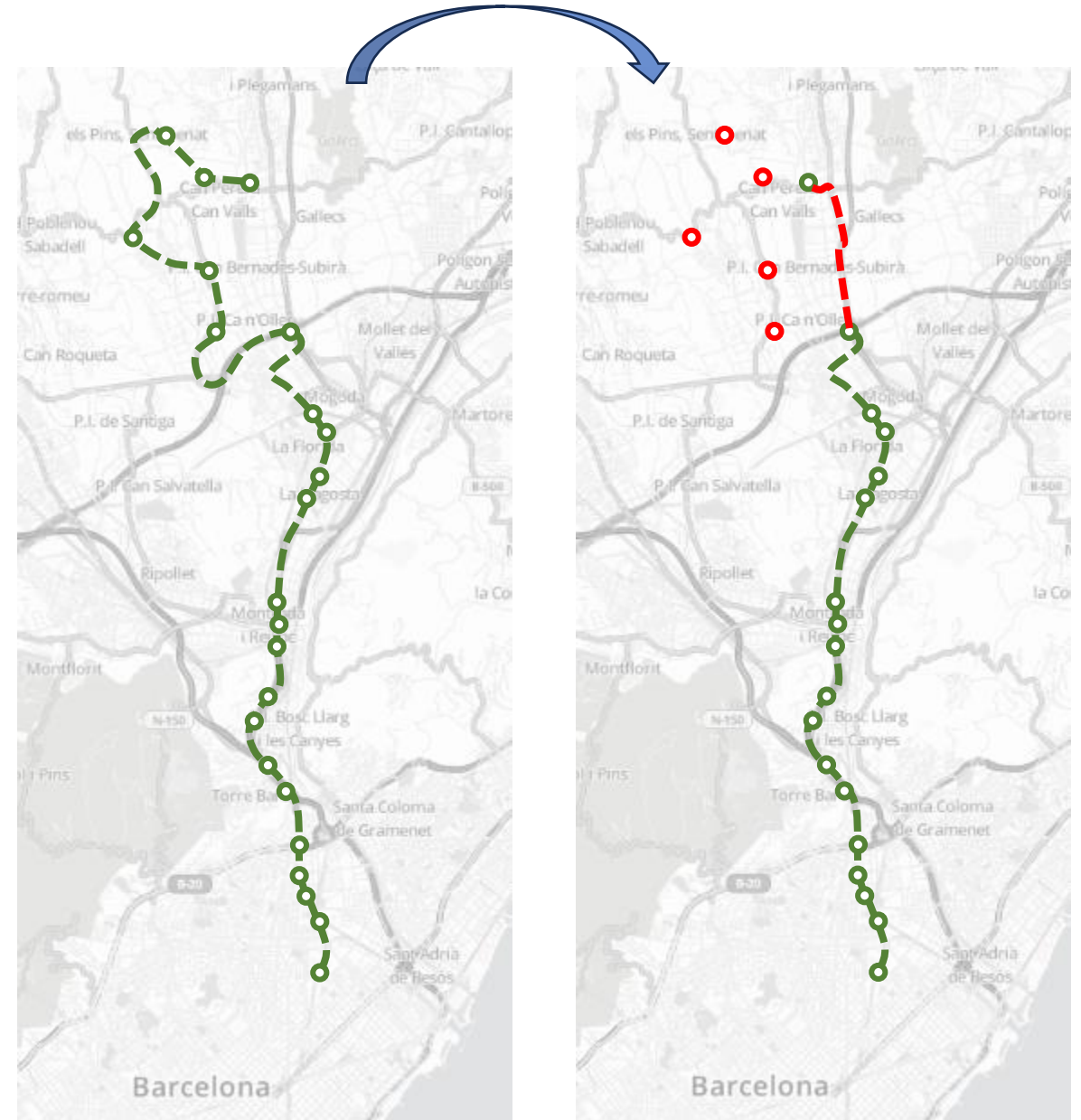
Sub-Use Cases

Sub-Use Case 2 (DOT to bus)

- Reverse Sub-Use Case 1.
- Detect stops that are currently "skippable", but which have a lot of requests -> convert to fixed schedule.
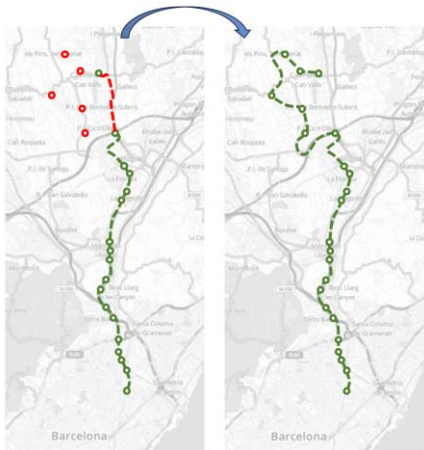
Sub-Use Case 3 (DRT)

- "Full DRT": fixed stops but dynamic routes, optimizing trips based on user requests for specific times and destinations. Tailored for areas with very low demand.
- Fusion of MND data with the other data sources.
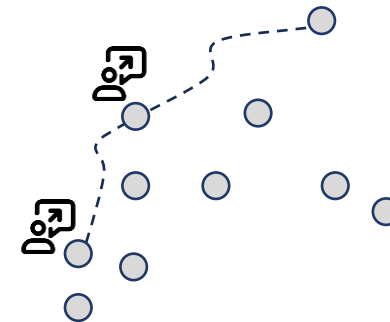
Current status / Next Steps

November 2023 → *October 2026*

deploy EMDS

Most important achievements in Year 1:

- Refine scope, map initial data products
- Design of iterative use case roadmap for both service planning *and* optimisation
- Onboarding of major PTO (Sagalés)
- Data "audit" of different PTO routes, initial analytics
- Initial connector deployment for Q4 2024

Next steps / coming challenges:

- Finish initial connector deployment.
- Showcase bus->DOT integration optimization for a specific subset of Sagalés' routes.
- Work in new public-private governance model for data space taking into account PTA, competitive PTO ecosystem, and digital service providers.
- Data usage policies: definition of common norms between diverse entities; analysis of implications from DGA, DA, etc.
- PTOs require an interface to SAEi platform connector to define policies and control core data sharing.

2024   2025   2026

Thank you for your attention!

For more information:

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Nommon