Michael Bloomberg:
"In God we trust. Everyone else: bring data."

Interreg CENTRAL EUROPE

Co-funded by the European Union

EnCLOD

Treat data as a public asset

an EnCLOD walkthrough

Olomouc

5.5.2026

David Bárta

CityOne

EnCLOD = enhancing governance by open data

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- DKV Debrecen Exclusive Public Transport Company LTD.
- CITIQ
- Palacký University Olomouc
- CityOne
- Urban Municipality of Nova Gorica
- University of Ljubljana
- University of Žilina
- ALDA+ SRL Benefit Corporation SB

- cca **200 sensors deployed in 5 pilot areas**
- Czech Republic pilot of **Olomouc** (cca 70 sensors) https://olomouc.digital/
- Topic: **heat islands** connected with parking areas

2019 issue on 2017 reality in Bristol, UK

Barney said:

"Because Bristol is further along its journey, it should be used as an **example of what's possible and where authorities can go.** Other councils should be looking to 'borrow' this investment and align what Bristol is doing in their areas."

Bristol

About Barney Smith : Barney Smith is a Smart Society Leader with particular experience in sustainable development, innovation and technology. His passion for technology goes back to the early 1980s, when at the age of 12 he sold his first computer programme. Barney has worked in a number of senior roles in the public sector. Most recently, he founded Perform Green, a Smart Society consultancy where he has held roles including:

- Programme Director at Bristol City Council to implement an ambitious integrated, multi-partner Smart City Operations Centre.
- Interim CEO of Bristol Is Open – a Joint Venture Company between Bristol City Council and University of Bristol to deliver a world-leading Smart City research and development testbed.

Barney Smith : Smart Society Leader 1155 | 430 000 | EN

The Smartest city in the UK

The work Barney has been involved in has led to Bristol being announced as the Smartest City in the UK by Huawei Smart Cities Index 2017 and to Bristol winning the Smart City Award at Mobile World Congress, Barcelona, 2018.

In his spare time, Barney sails, explores the countryside and volunteers in the community – he is Chair of a local Outstanding Special Educational Needs school. Barney studied at Cambridge University (MA) and Imperial College (MSc), and is a Fellow of the Royal Society of Arts (FRSA).

: An introduction to Bristol

Bristol is one of the largest cities in the UK, with a population of 430,000 people from highly diverse cultural roots. It has a long history of engineering excellence, from Isembard Kingdom Brunel to the co-development hub of Concorde and, more recently, silicon design.

It also has strong media and creativity heritage, with 40% of world wildlife filmmaking linked to studios in Bristol, most famously the Blue Planet series. The city is also home to artist, Banksy, and Aardman productions, creators of Stone Age and the Wallace and Gromit series.

Along with the neighbouring city of Bath, Bristol is an important tech hub, employing nearly 37,000 people with an annual digital turnover of £8.1 billion. In 2017, research identified Bristol as the UK's #1 Smart City, overtaking London (Huawei Smart City Index) and to Bristol winning the Smart City Award at Mobile World Congress, Barcelona, 2018

: Long-term goals for Bristol

Following its status of European Green Capital in 2015, Bristol continues to pursue green and environmental initiatives and aims to become carbon neutral by 2050. As part of this, Bristol has ambitious plans to continue leading the way as a Smart City.

The city aims to build knowledge and develop businesses to deliver Smart City solutions that benefit its citizens, as well as export and create jobs. This is guided by a Smart City Framework and aimed to address a number of city challenges, including congestion, air quality and, in particular, inequality and an aging population.

Barney said "Because Bristol is further along its journey, it should be used as an example of what's possible and where authorities can go. Other councils should be looking to 'borrow' this investment and align what Bristol is doing in their areas."

: Bristol Smart City projects

There are many projects being led by multiple stakeholders that together play an important role in Bristol being a leading Smart City. The City Council is a major player in many projects, but it is by no means alone.

Two initiatives led by Barney are:

- **Bristol Is Open** – a Joint Venture Company between Bristol City Council and University of Bristol to build and operate a research and development testbed for Smart City and future communication system technologies.
- **Smart City Operations Centre** - built and operated by the City Council, this multi agency centre delivers joined-up operations underpinned by an Open Data platform and advanced analytics capabilities.

British always calculate the benefits: creativity, employment, turnover made by **a strong city agenda**

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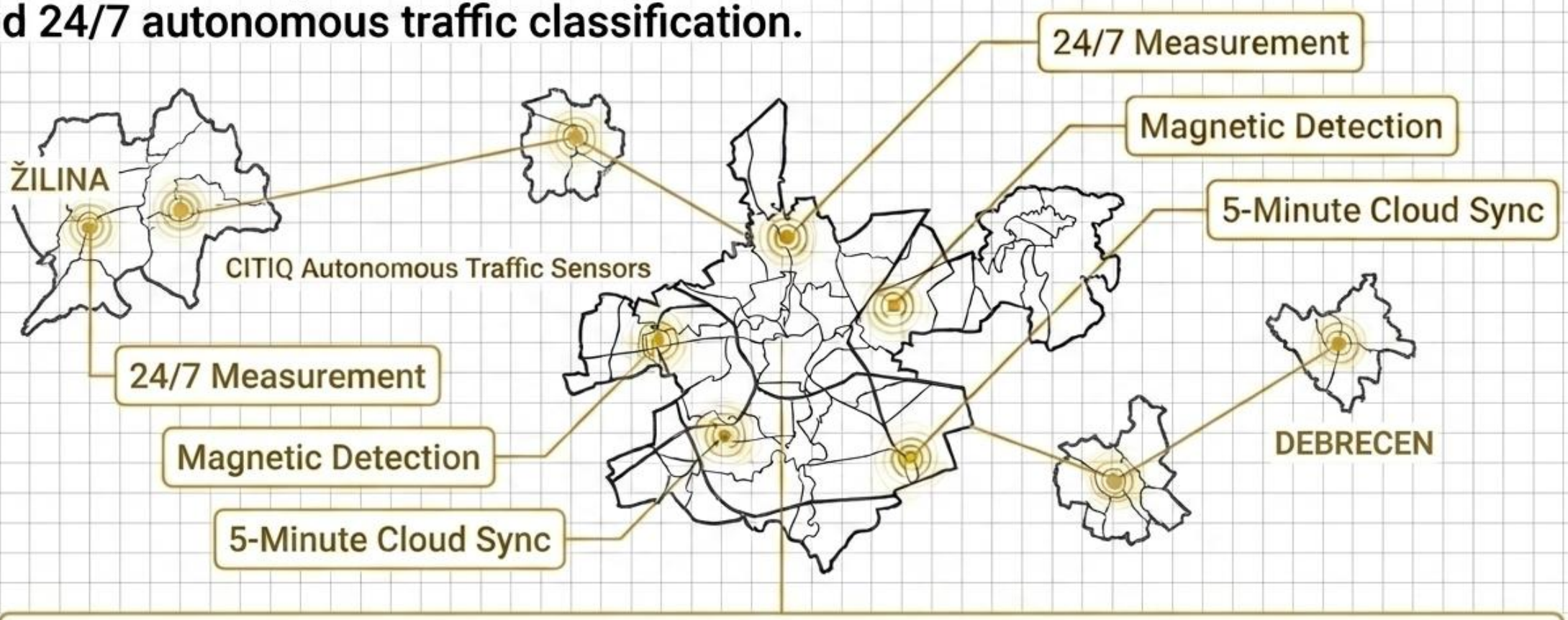
Olomouc is to become a Czech Bristol

- EnCLOD recommended that **open data from IoT sensors on climate and traffic** is ethic, feasible and affordable and means a common ground for any city tools or applications (no GDPR needed)
- Based on EnCLOD pilot in Olomouc, CityOne/UPOL prepared **a wide area digital twin** which is now procured (urban lab with more than 400 sensors)
- **Tested within EnCLOD hackathons** 100 % ready apps cannot be built so fast but thanks to AI they create fast prototypes, there can be tens of apps and so there is **a need to test and validate**
- Having open IoT data on climate and traffic means running **a wider set of digital tools** developed by a wider community or companies supporting local innovations ecosystem and city twinning (**a common cities Appstore**)

The Multiplication Effect

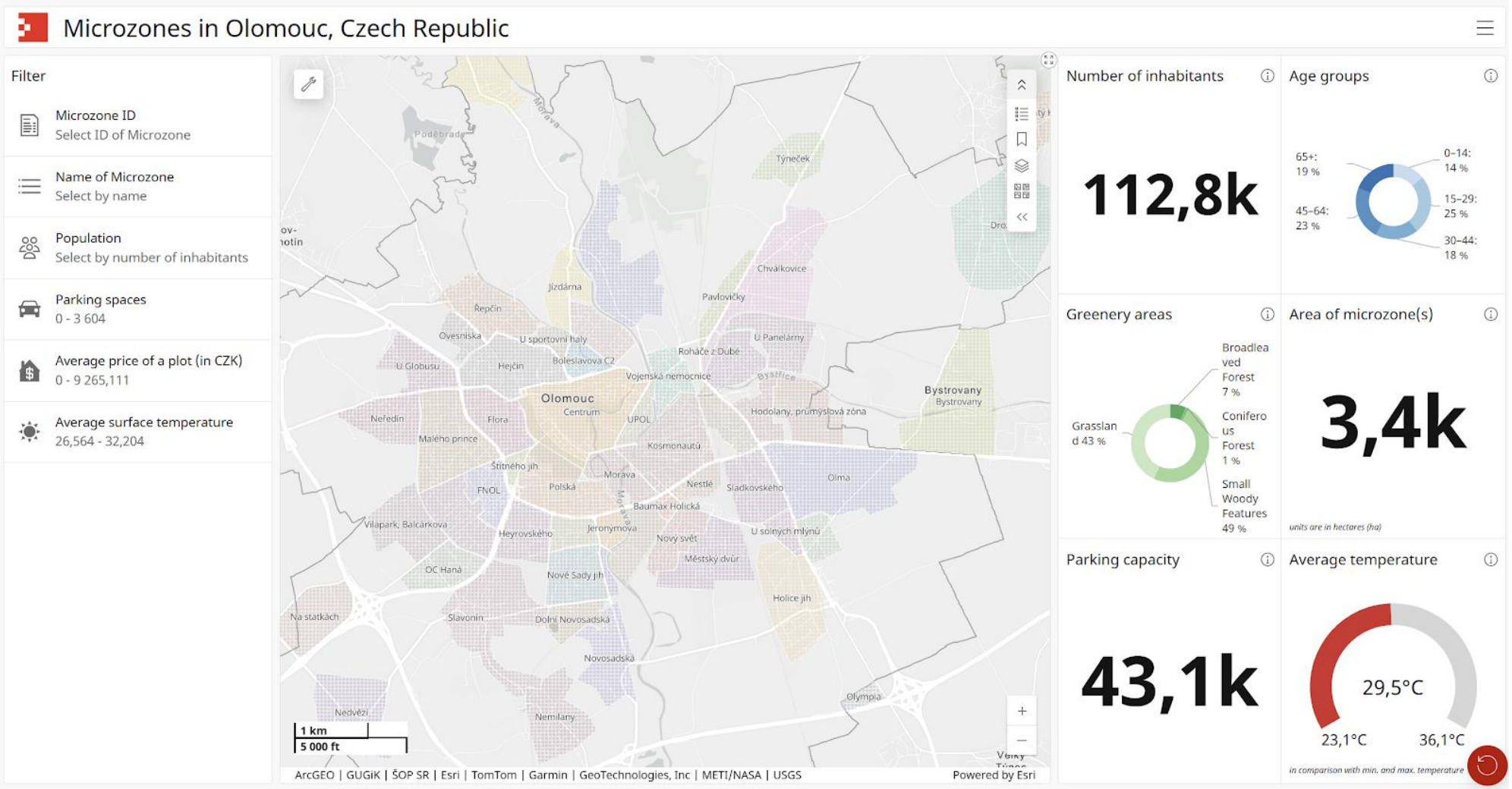
Scaling from temperature to 60 city micro-zones and 24/7 autonomous traffic classification.



Once open data is on the portal, any expert can use the AI Manifest to instantly prototype solutions for parking, traffic, or sustainability. This multiplication effect also extends between cities, allowing one application to serve multiple municipalities.

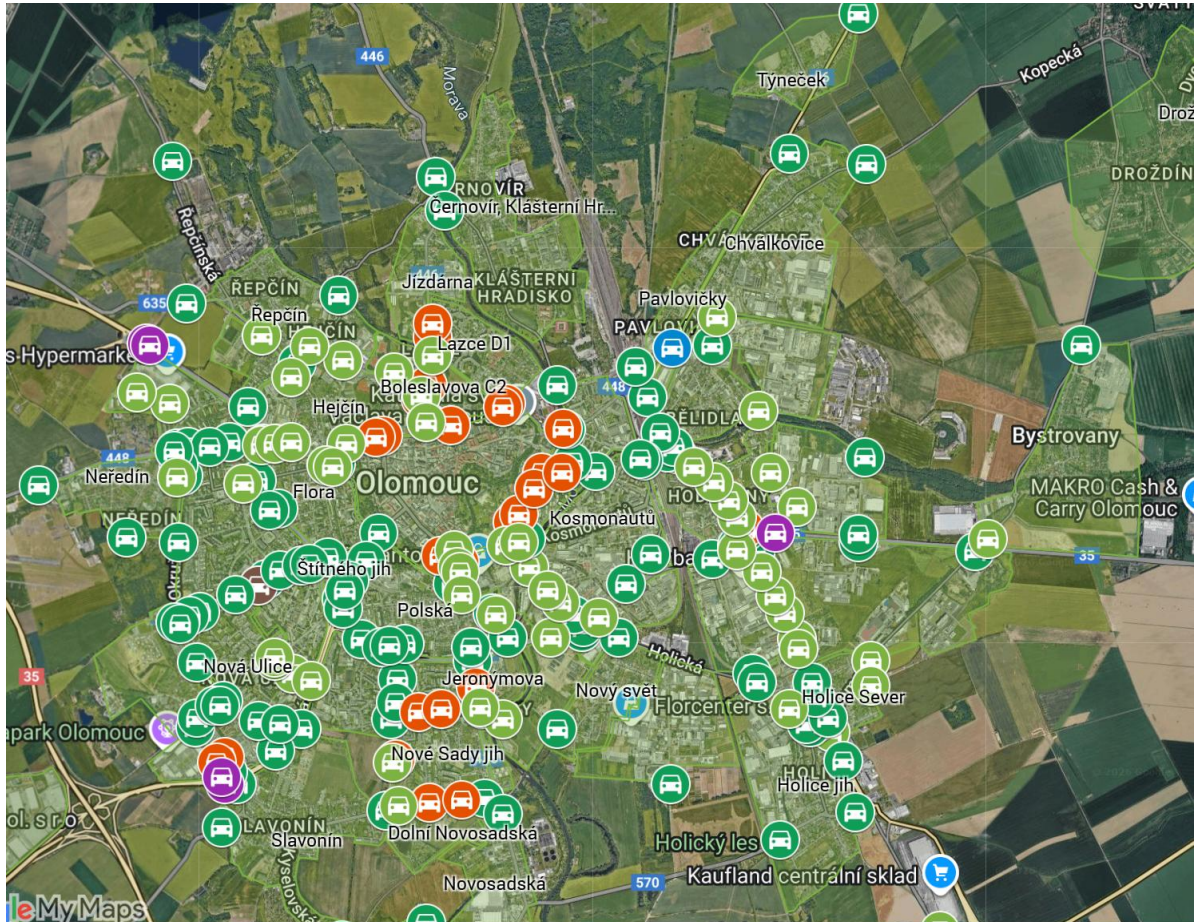
NotebookLM

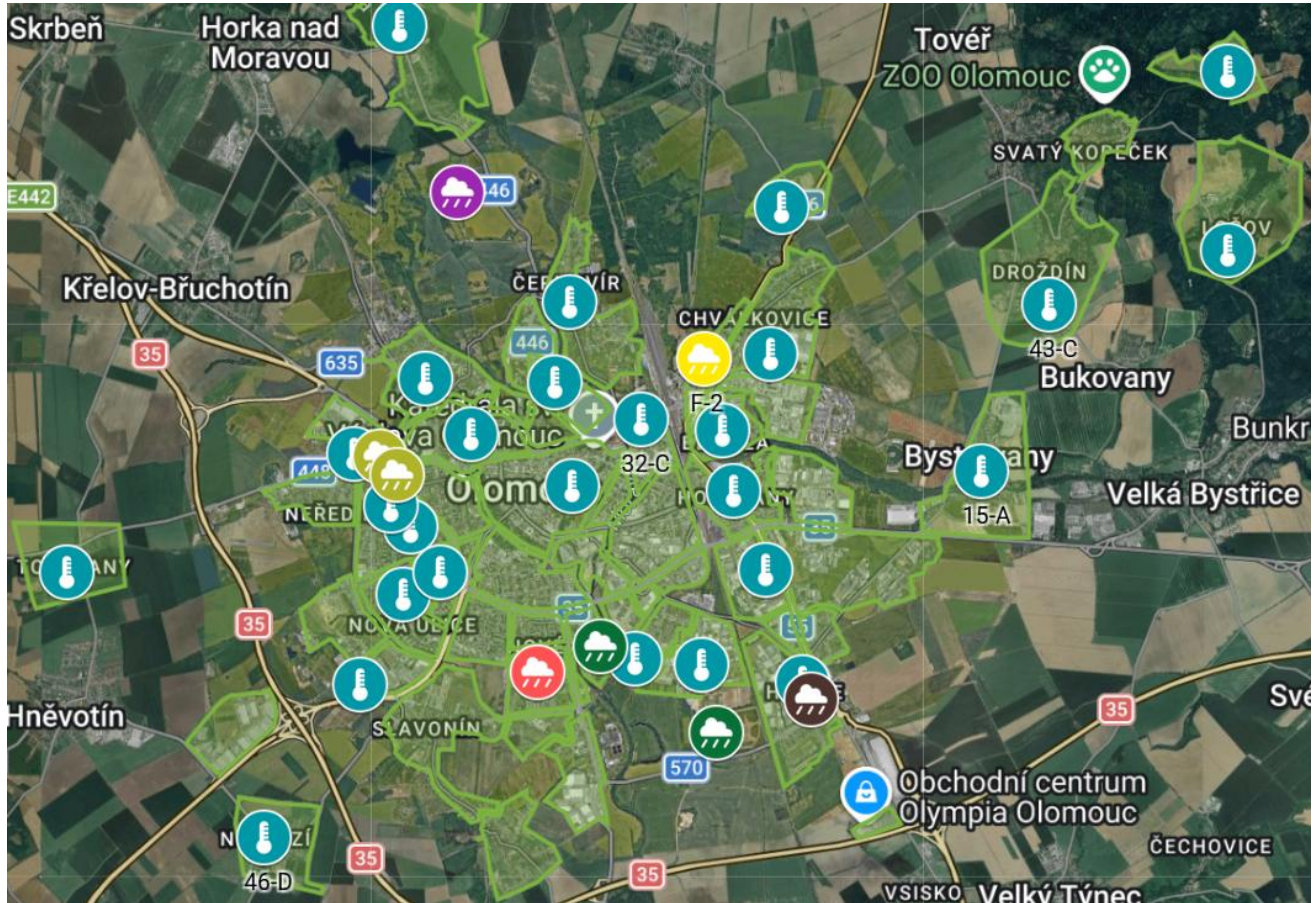
Microzoning: a reference framework for digital urban planning; works as an **open data registry** and enables to **compare the zones** among the cities



Sensor networks as mining machines

- Dynamic data show **people behaviour** and environment changes
- Enables to set up **limits and requirements** on territory development





Olomouc digital twin will have 40 spots with 5 temperatures = new apps

STATION OVERVIEW IN PERIOD

#	SENSOR / LOCATION	AVG RANGE	P5 (THRESHOLD)	P95 (LIMIT)	MONTH PEAK	
2	SMETANOVY SADY HcJCjLU9542SranQwxAJZr	14.94°C	0.99°C	22.36°C	22.59	29
3	TRNKOVA QYjB224iCx3RTcDn5DL7iX	13.29°C	1.32°C	21.77°C	23.12	29
4	FISCHEROVA NHxfjGZWyWSTP8a6FLkZJG	13.52°C	0.81°C	19.07°C	21.19°C	29
5	U LETADLA PS6WyjtdasZLMJB3sEusz5	12.93°C	1.25°C	19.64°C	20.07°C	29
6	FUGNEROVA kUmRffyMhmSXA2eemDGP64	11.77°C	1.10°C	18.45°C	19.09°C	29
	NÁM					

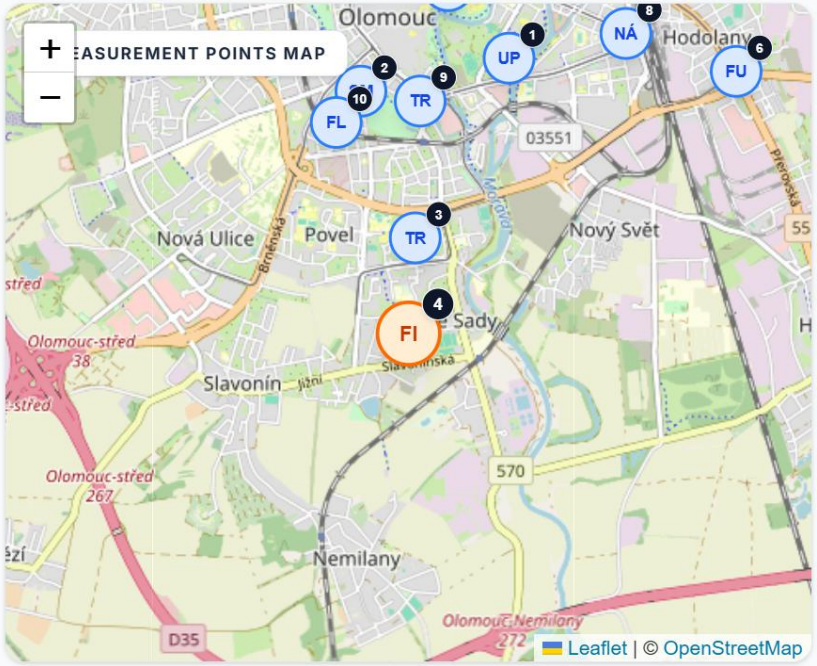
ACTIVE

ORDS

DISTRIBUTION % Fischerova

Extreme:	31.0%
High:	24.1%
Warning:	10.3%
Stable:	24.1%
Optimal:	10.3%

CANCEL SELECTION →



WHAT IS DTR?

DTR Diurnal Temperature Range (DTR) represents the difference between daily maximum and minimum air temperature. In an urban environment, this indicator is key to monitoring the heat island effect. The lower the DTR, the less the location cools down at night.

This app was developed by another user. It may be inaccurate or unsafe. Report legal issue

Bologna – občanské digitální dvojče

A Geometric, Physical... and Civic Digital Twin

Modelling of Buildings and Infrastructure

- Using LIDAR data, satellite imagery, and orthophotos
- 3D modelling of city buildings Urban green spaces

Modelling of the City's Physical Processes

- Building's Energy Modeling
- Integration of climate and environmental data calculation of specific indicators for vegetation and the environment

Geometric and Physical Digital Twin

⇔

Civic Digital Twin

Modelling of Social Dynamics

- Individual and collective behaviours

Modelling of Transformation Processes

- Citizen attitudes toward change
- Impact of shifting attitudes on transformation processes

Engagement Tool

- Enhancement of data collected through civic engagement and public consultation

From traffic control to urban mobility planning requires **political bravery**

Gemini article based on sensor data measuring Lidl Outlet impact

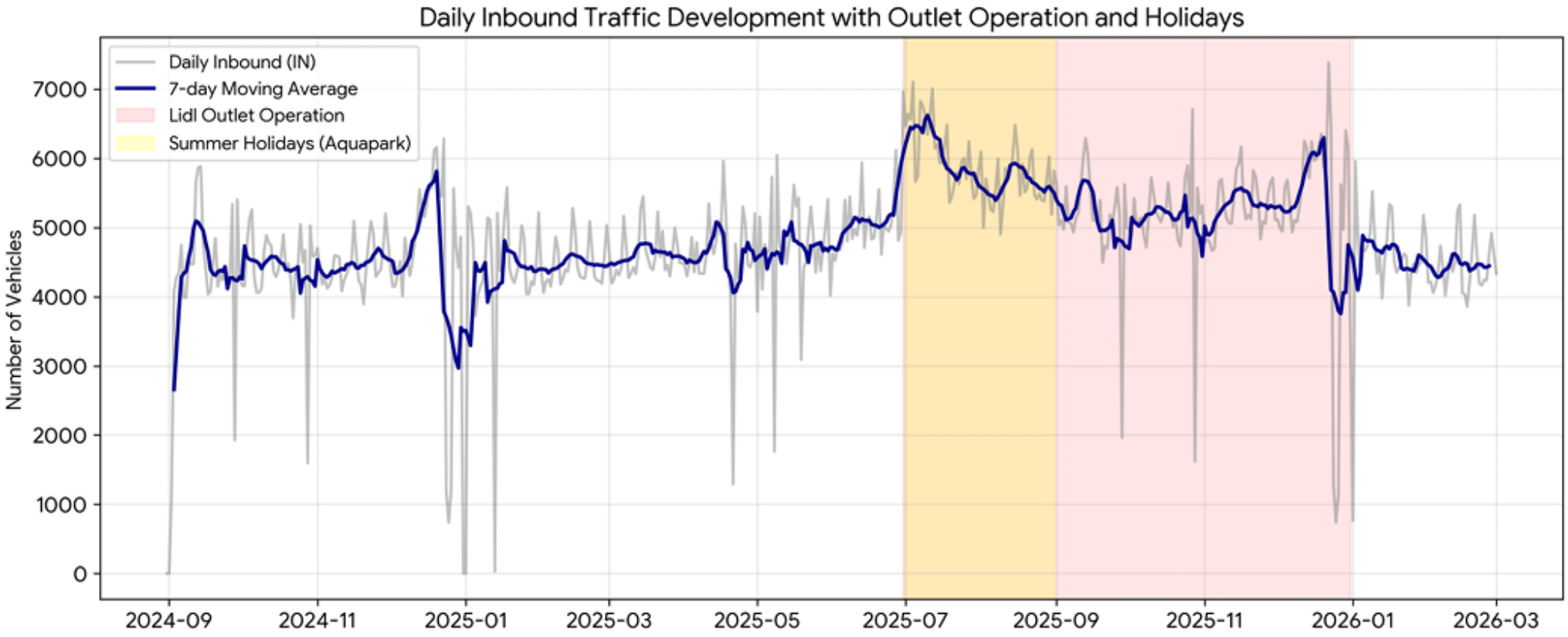
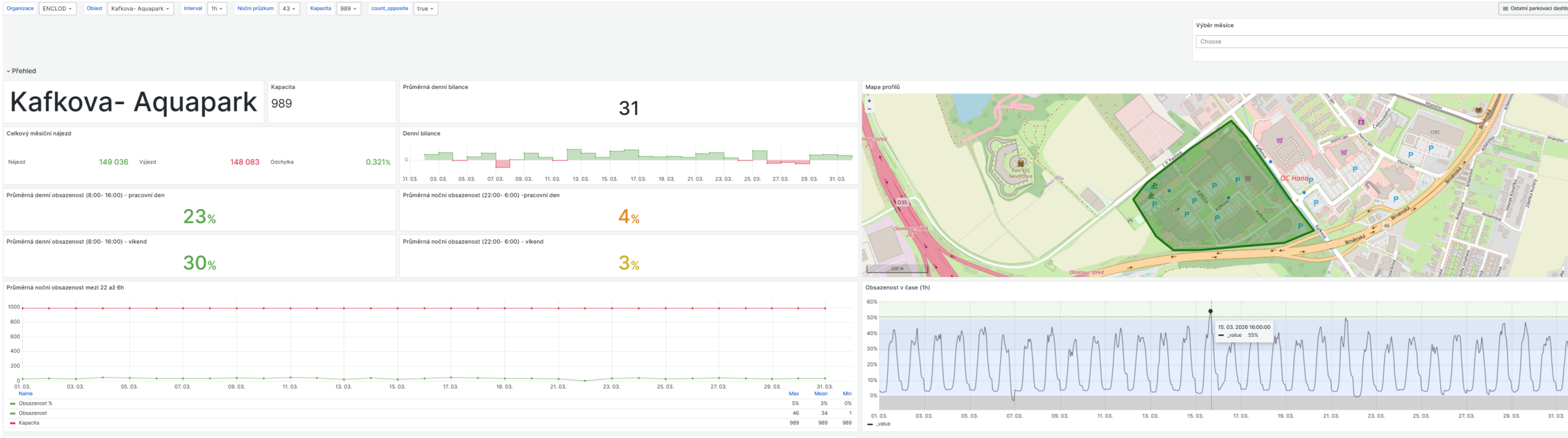


Figure 1: Time series of inbound vehicles with a 7-day moving average. The operating time of the Lidl Outlet (red) and the summer holiday period for the aquapark (yellow) are indicated.

Data driven opportunity to make shopping areas greener

- Max occupancy 15 March 55 %, usually 30 %
- Overnight parking survey to calibrate (43 cars in a 989 parking spot area)



AI chatting on „live“ sensor data

- Any use case support
- Graphics in minutes
- Assumptions need to be revised
- Existing dashboards still needed

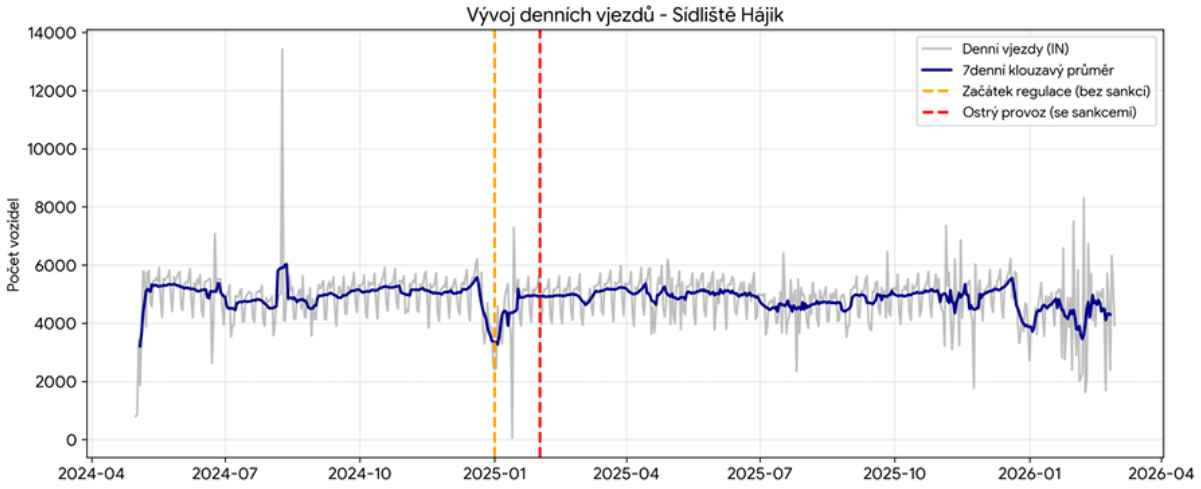
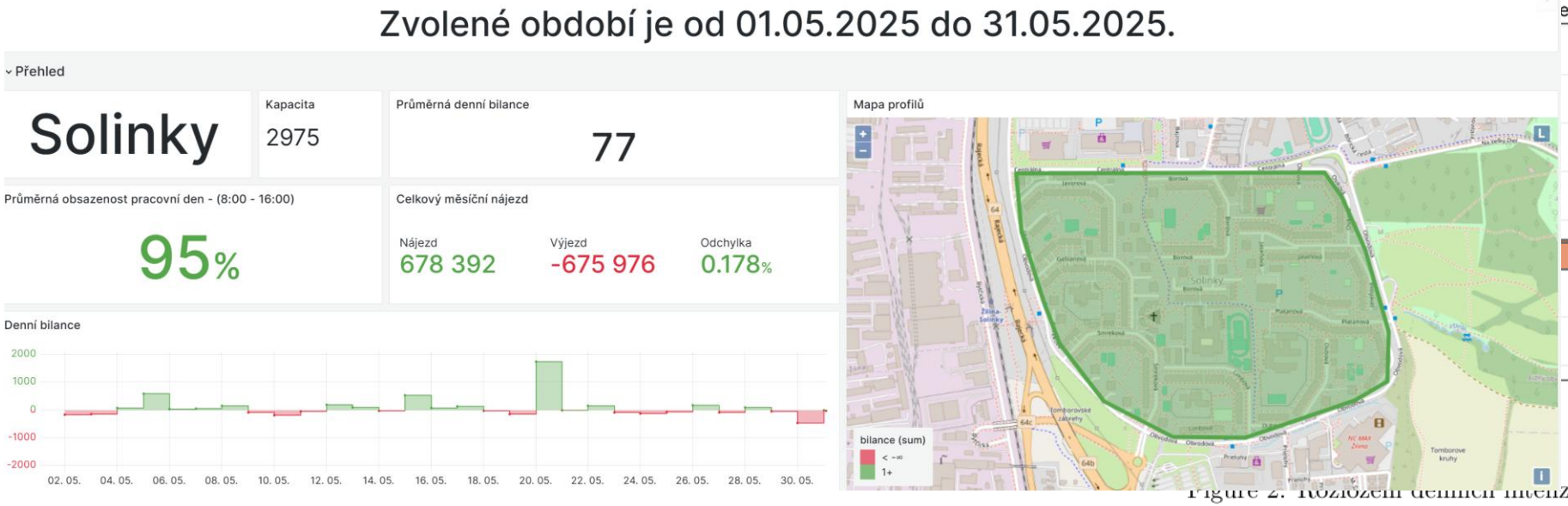


Figure 1: Vývoj denních vjezdů se 7denním klouzavým průměrem a vyznačenými milníky regulace.

Z Obrázku 1 i 2 je patrné, že zavedení rezidentních zón vedlo v první fázi ke znatelným změnám v objemu dopravy. V přechodném období sice doprava kolísala, nicméně po spuštění ostrého provozu (kdy si obyvatelé i návštěvníci zvykli na nutnost registrace) vidíme strukturální posun ve využití zóny.



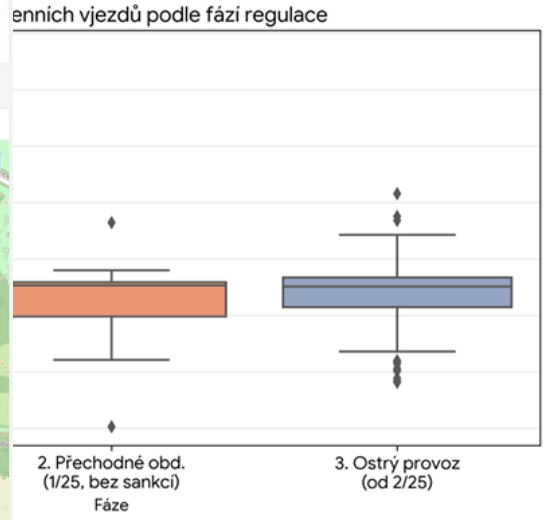
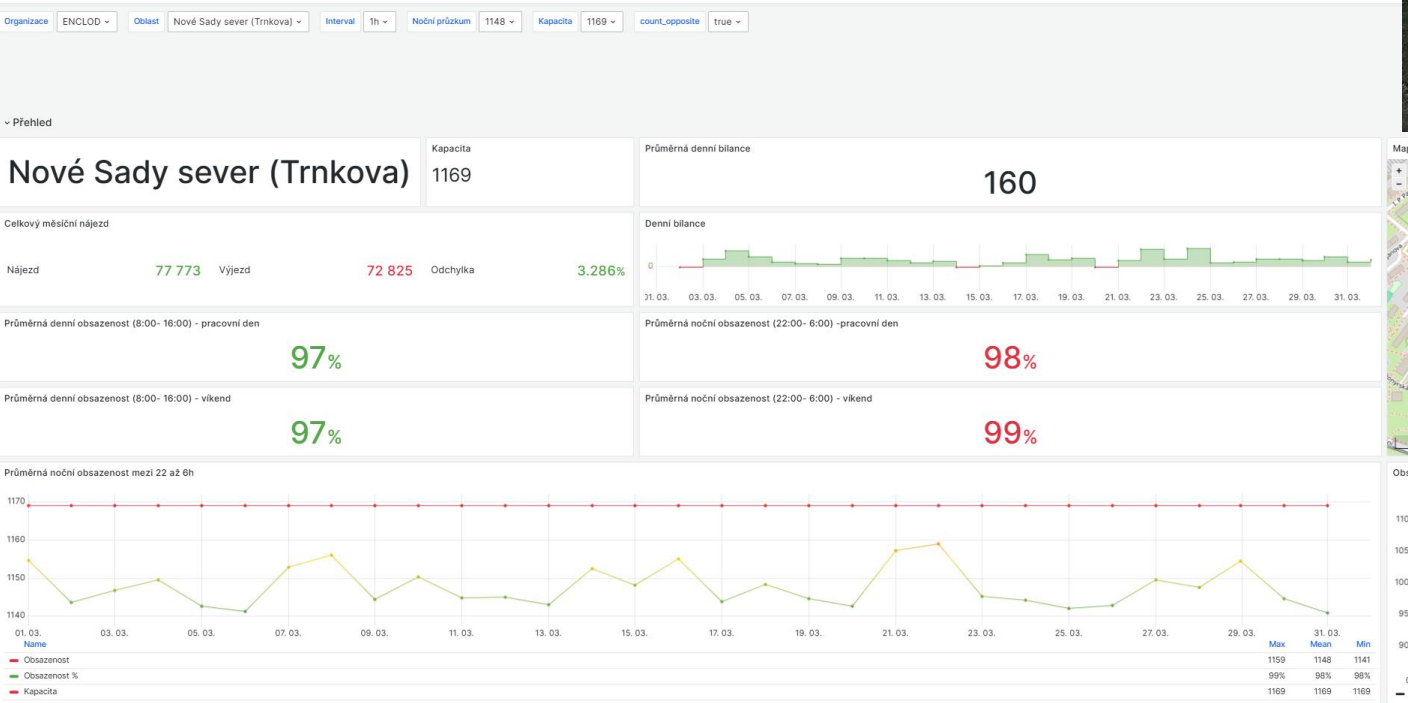


Figure 2: Rozložení denních intenzit v jednotlivých fázích zavádění regulace.

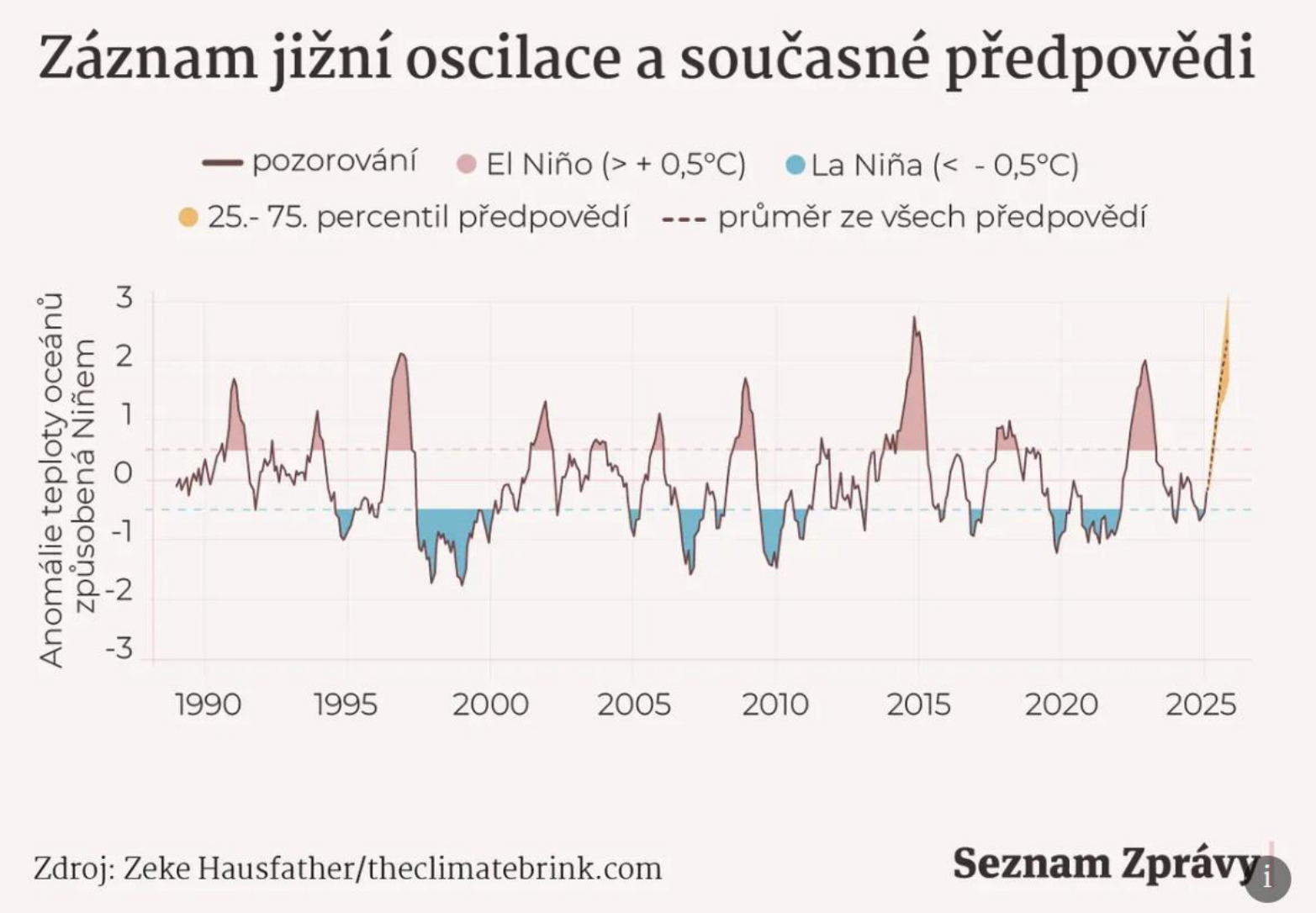
Data driven planning of new services

- Min occupancy 26 March at 1p.m. 88 %
- Overnight parking survey to calibrate (1148 cars in a 1169 parking spot area)



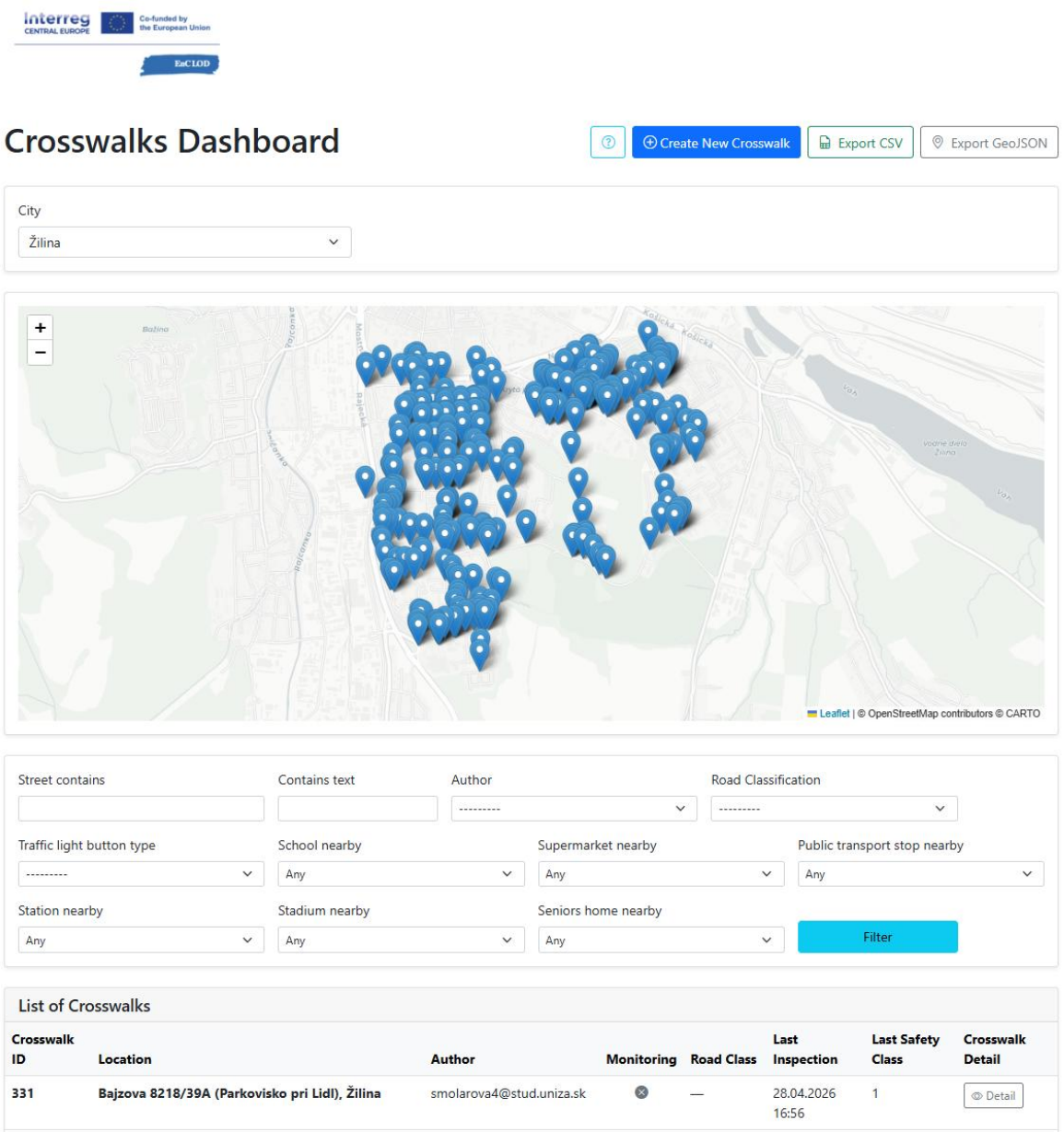
The climate change impacts: heat island risks

- 2025 was the third warmest year after 2024 and 2023
- But in Olomouc it was rather cold, just 3 heat waves
- Climatologists expect the new record in 2027, so warmer winter 2026 is expected and we can provide evidence for
- we can have **a local impact climate change** tool
- We can **correct data from satellites**



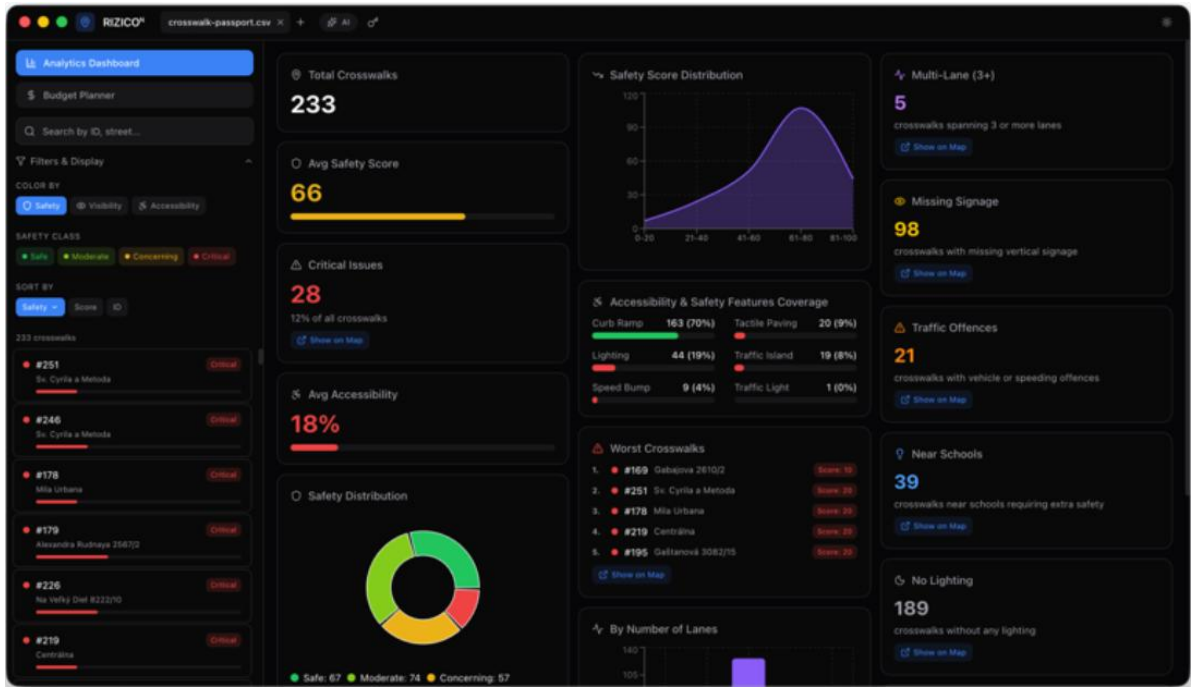
How to make a tool: Žilina traffic safety digital twin of crosswalks

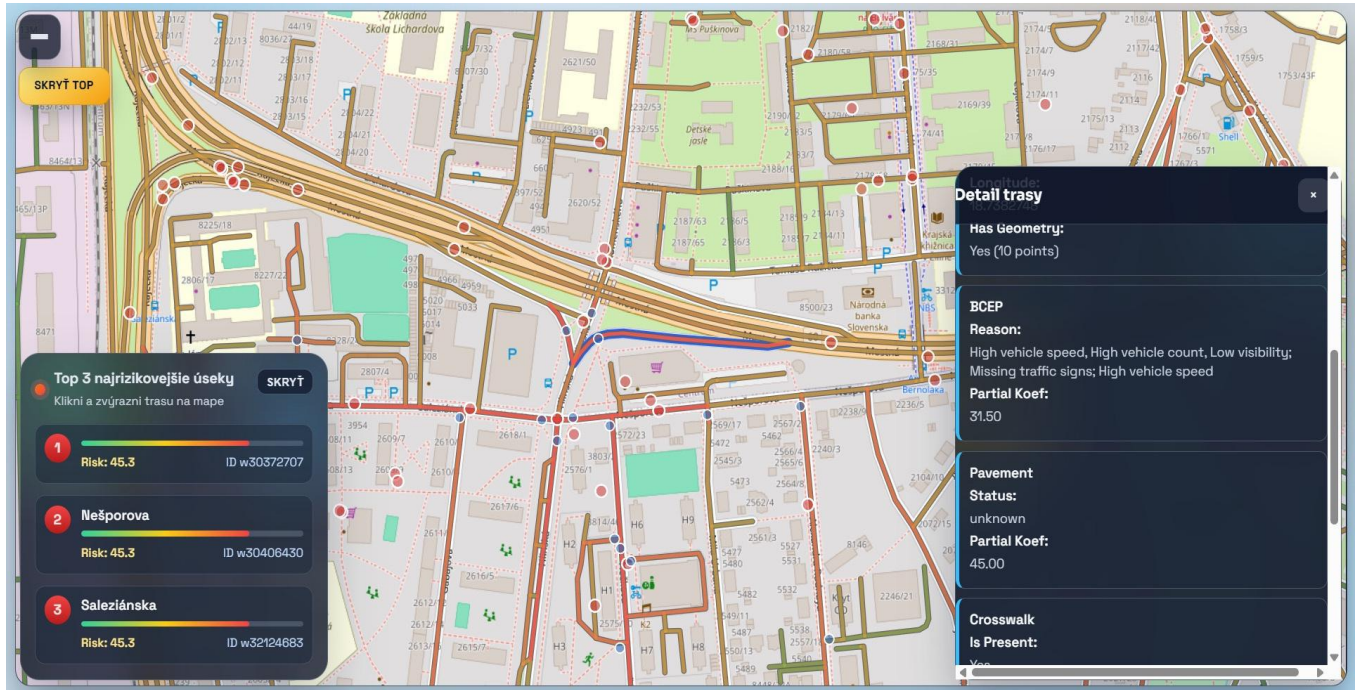
- **Crosswalks in the centre of the solution**
- **State of the art:** A traffic safety audit in June 2025, which data is available *(e.g. accidents),* end user consultation
- **Expert design:** A tool for data collection (almost 400 crosswalks), UNIZA designed with CityOne, CITIQ is to code
- **Collection of data:** check the automation OSM, students to collect data on the crosswalks *(cca 270 for the hack)*
- **Data provision for the hackathon:** Open data portal, various type and sources of data
- Output should be a **tool for traffic safety prevention specialist** (municipal police)



Hackathon Žilina 2026

- Two very nice apps have been produced (RIZICOn and Traffic risk segmentation analyzer)
- Need of extra work, potential merging is foreseen,





Žilina tool(s) next steps

- Data collected by students on crosswalk need **traffic safety expert review** – a trusted data set
- Tools created need **traffic safety expert review**
- Tools need **testing by the city** (methodology on how to test and feedback)
- Tools need **testing by the end users** (MP) (new features, new data)
- **Tool for the pool** (any tool should be verified before sharing with the others)

Imagine AI practice in territorial governance

Education of staff by digital tools that can be handy for their work so that they can do the change (true digitization)

- **2 hours per week = 1 day per month** of city staff devoted to AI apps testing and validation
- **A pipeline of apps** to be handled as developers trust the city agenda
- **Cooperation with the University**; students as project leaders
- **Annual hackathon** as a city/region/university event
- Twinning among the cities and **sharing the verified tools**

So an **EnCLOD city knows** which data is the most used ones, which use cases can be covered, who is developing a particular tool, what is in the pool

EnCLOD investigated how to set up a network of likely-minded cities to exchange the tools and exps

How to measure success in open data

- **British way:** "If just 1% of planned investment went into innovation, it could create 18,000 new solutions and 600,000 jobs.„ (*a recent UK report highlight)*

- **EnCLOD way:** how many cities use a particular app, which open data sets are the most used, how many users use open data portal

Open data services required in the public procurement for Olomouc digital twin

- **Unified data collection** (the contractor will operate databases containing real-time data and will resolve incidents related to connectivity or detection accuracy)
- **Data aggregation and transformation** (the supplier will operate a database containing calculated short-term and long-term statistics to ensure good responsiveness for data analytics tools; this involves calculated data for individual traffic profiles, microzones, and climate points in 15-minute aggregation, i.e., "logical elements" will be created that combine several real elements—one traffic profile consists of N detection sensors, one climate point consists of N detection sensors—this step contributes to the continuity of data series and thus addresses the need to replace malfunctioning sensors)
- **Online communication** (the supplier will operate a public website featuring the city's branding)
- **Integration API** (the supplier will operate a data registry containing metadata descriptions and API documentation for retrieving published data; the API should comply with standard formats and specifications such as OpenAPI (https://www.openapis.org/)
- **Centralized device management** (the supplier will operate a registry of detection devices with the option to export a list of devices and their locations, which could be used by the administrator of the region's digital technical map; changes over time—i.e., replacements, repairs, preventive maintenance, etc.—must also be recorded)
- **Device status monitoring** (the supplier will operate a system monitoring the operational status of devices and, in the event of malfunctions, will notify data subscribers and the public)

Open data services required in the public procurement for Olomouc digital twin

- **Big data support and advanced configuration tools** (the contractor will operate a helpdesk as a service for potential data subscribers, recording their requests and possible solutions to their needs, which may lead to the creation of new dashboards or datasets; the contractor will maintain a list of data subscribers, user roles, and permissions)
- **Open Data** (The supplier, in cooperation with the city, will publish selected aggregated data on the city's open data portal and also publish it in the national catalog)
- **Reports and Statistics** (The supplier will operate a public dashboard with sample data and reports and will prepare a brief annual report for the city containing quantitative and qualitative system parameters as feedback on system operation)
- **City Hackathon Partnership** (The supplier will actively participate in the annual hackathon and will provide support for contestants' use of sensor data)

Money cannot buy it! Open data as a valuable public asset

Digital twin can be succesful if it is not just an item in the city budget, but

- a reference framework (*microzoning*)
- a service to data consumers *(how well and friendly the open data portal is*)
- a university study field and the hackathon, an ecosystem of local partners and citizens
- a network of cities sharing digital tools

Next steps - 2026 priorities

Civic Digital Twin Model Evolution
Extension of the model, new tools, and public interface: thematic focus on Mobility, Heatwaves, Historic Center.

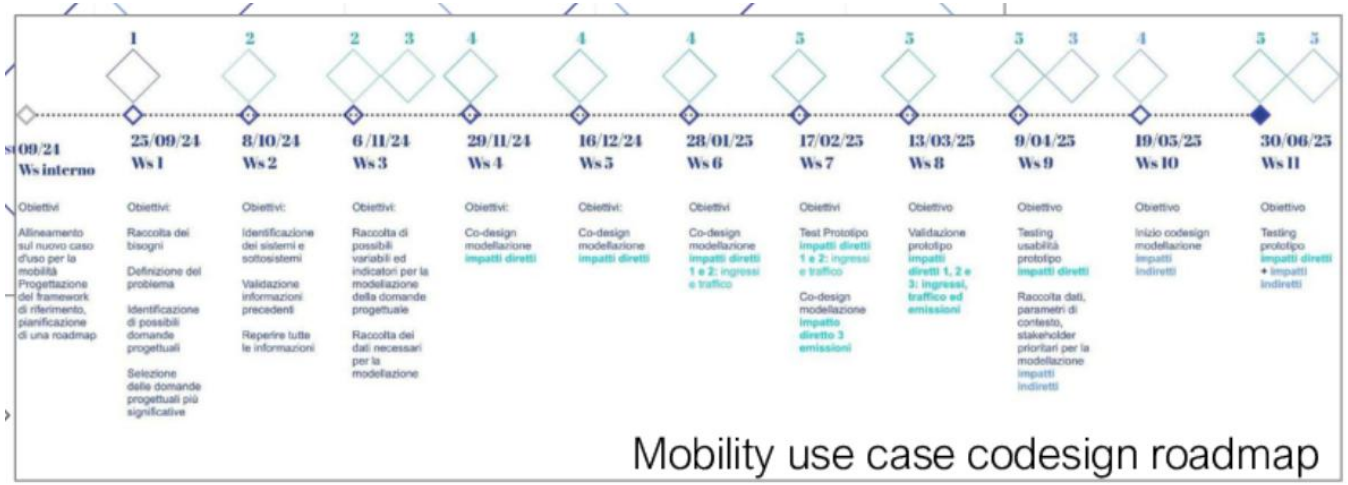
3D Geometric Model
Development of an interactive 3D city model with integrated thematic data and combined with the Civic Digital Twin for comprehensive simulation

Data Governance
Evolution of processes and tools for secure, transparent and integrated data management.

Fairness and Inclusion
Development of indicators to assess equity in models and scenarios for vulnerable groups.

AI Ethics and Reliability
Sandbox for AI Act compliance: safety, transparency, and reliability.

External Engagement
Civic participation, data crowdsourcing, and codesign of the public interface.



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EnCLOD - Enhancing governance Capacities of Local authorities using Open Data

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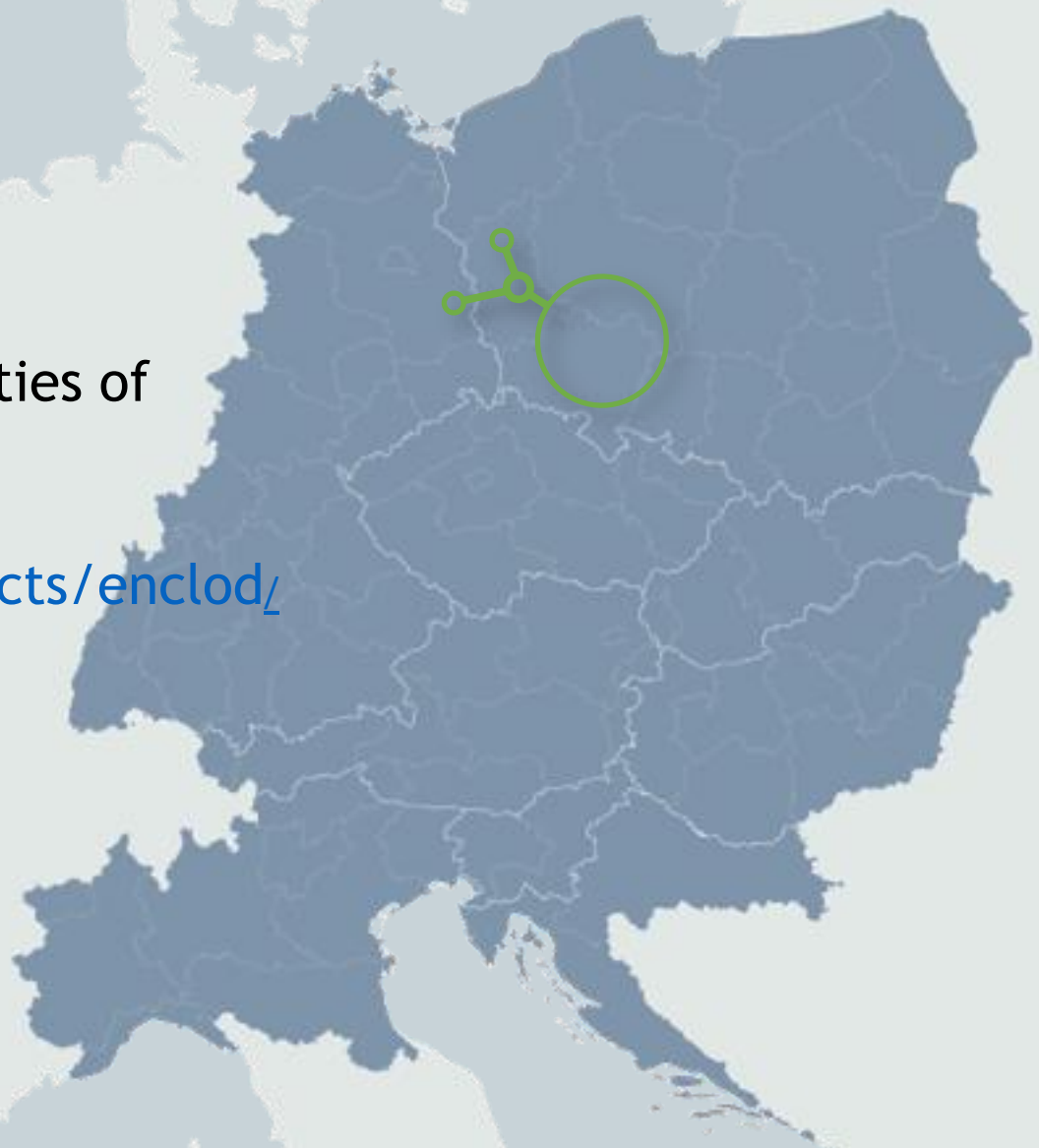
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