Mappost

Customized route and resource optimization solutions

Advanced Waste Management Route and Resource Optimization with Mappost

Tehnoeko Conference

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WM Trends from the New Nordics

From a policy perspective

- The Nordic countries have set ambitious targets to reduce waste generation and **increase recycling rates**
- Implementing extended **producer responsibility schemes** to ensure that manufacturers take responsibility for their products' end-of-life management (e.g. deposit refund systems and their management)
- Focus on implementing **circular economy principles** to reduce waste and promote the efficient use of resources

WM Trends from the New Nordics

From a consumer perspective

- **Pay-as-you-throw systems**: households pay for the amount of waste they generate
- **Separate waste** collection
- **Transparency**, information availability **online**: manage their waste services online or through mobile apps, such as requesting a bulky waste collection or reporting a missed collection, and accessible information
- Need for **efficient and reliable** service
- Request **last-minute** changes, e.g. «empty tomorrow for me»

Other trends

- **IoT** devices: container fulness sensors
- **RFID** identification
- **Underground containers**
- Development of cities, urbanization
- **Changing service rights**, new regions to collect waste from: how to collect waste efficiently from the very first day of operations in a new territory?
- Cost increase makes it economically viable to invest in **advanced technology**
- **Sudden changes** and last-moment demand, e.g. previous evening request to ”please empty tomorrow for me"

What does it mean for waste management providers & municipalities?

Provide **service quality** for citizens: reliable service, fast reaction, feedback on collection status

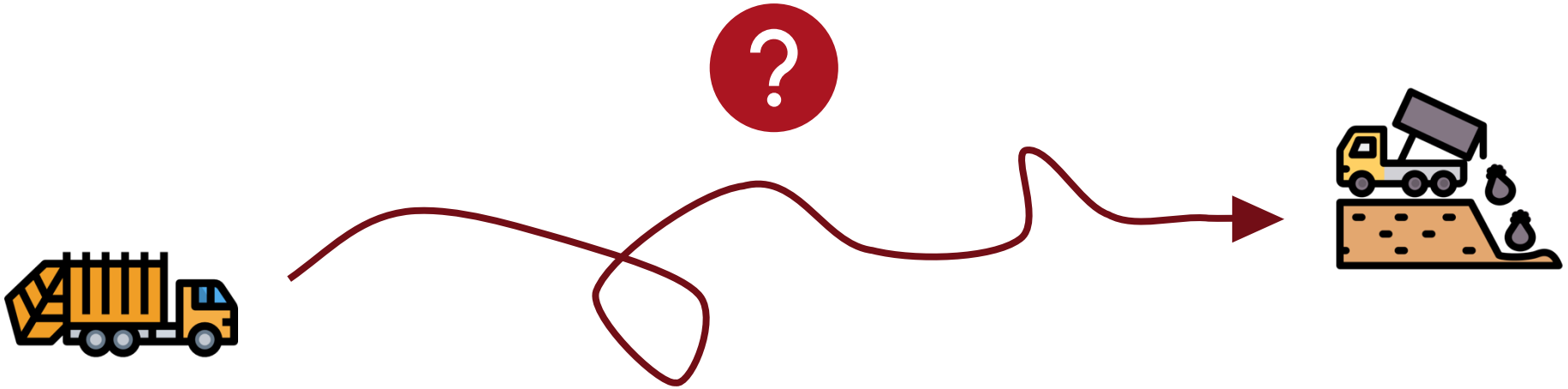
Maintain **low cost** levels

Data in **digital** format

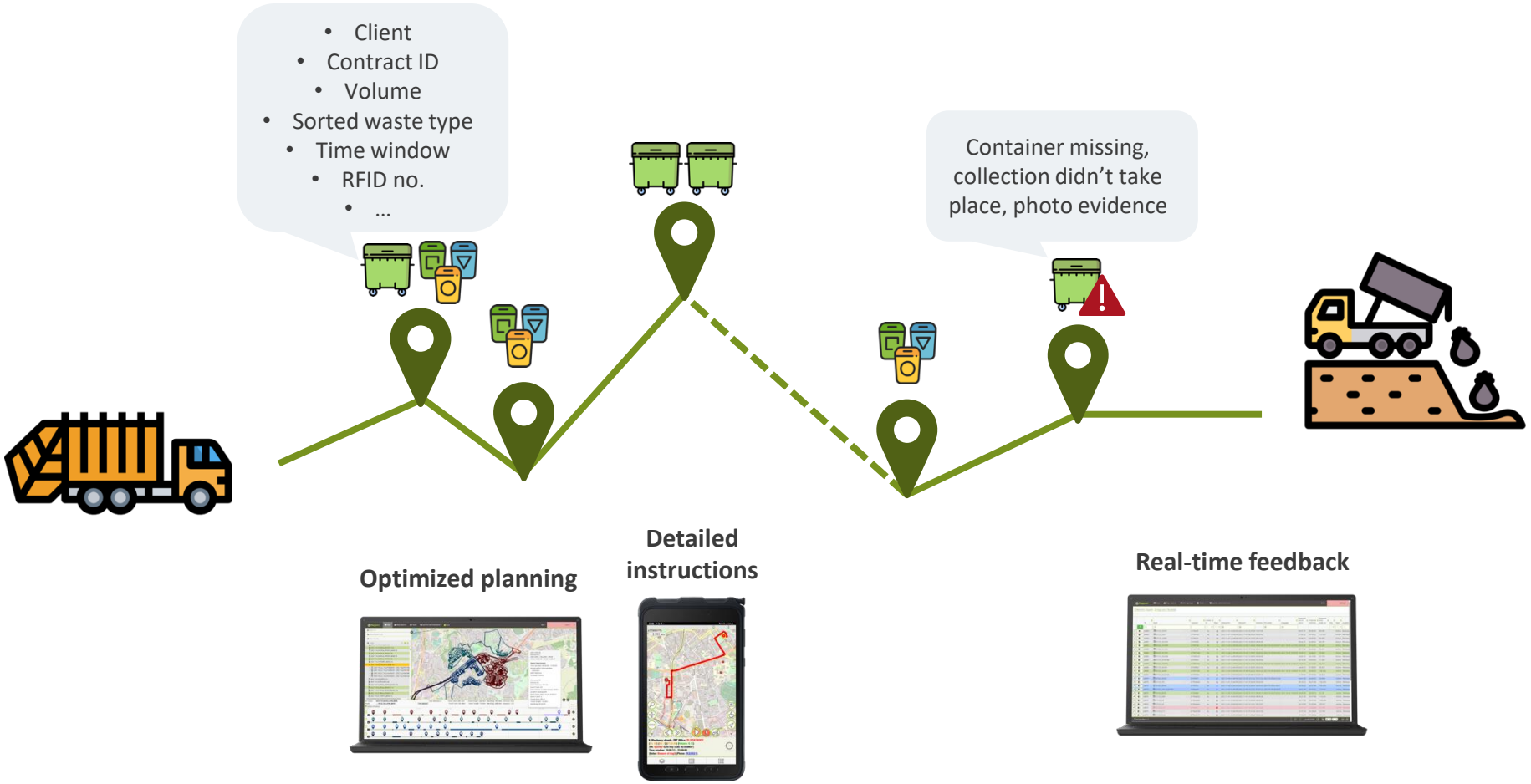
Online **connectivity**

Full **control and traceability** over waste collection process: digital process and infrastructure

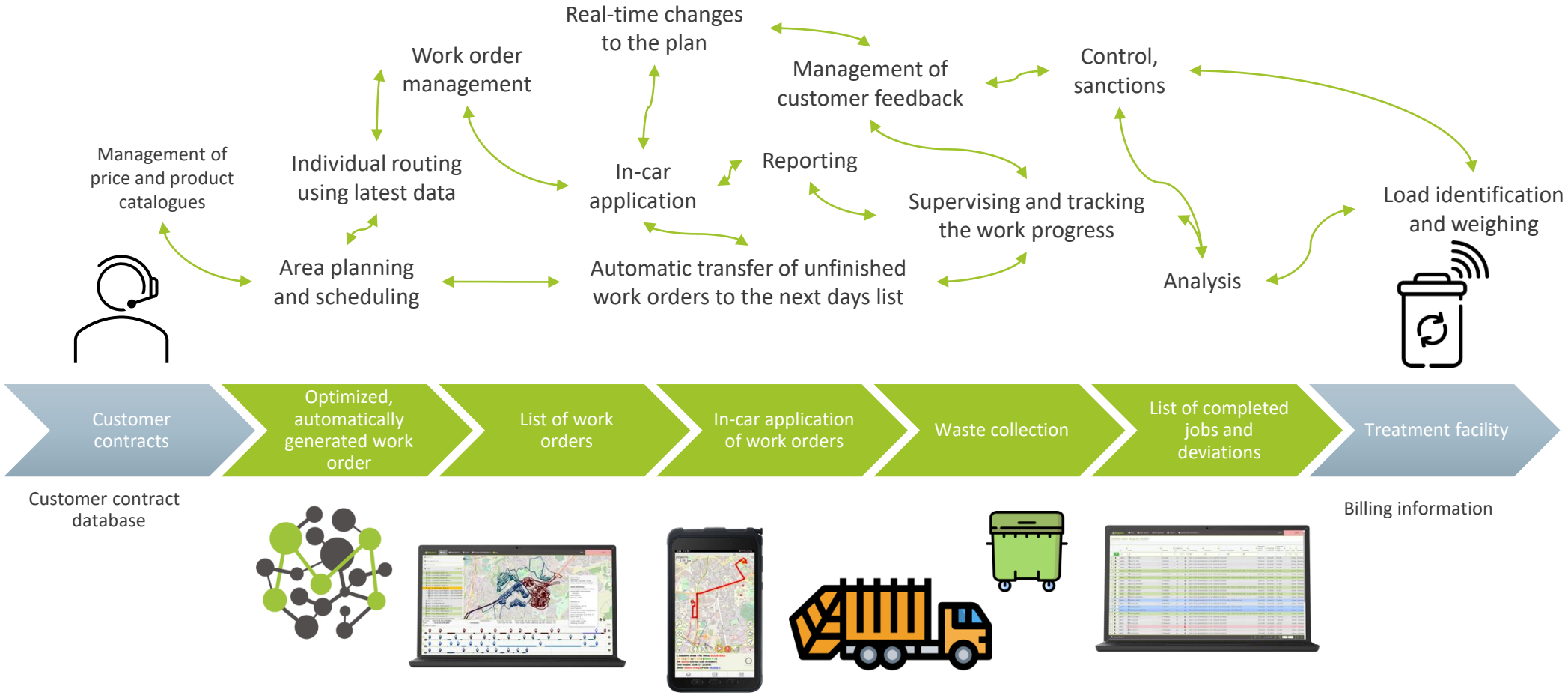
Full control and traceability over waste collection process



Full control and traceability over waste collection process



Software functions needed for waste logistics



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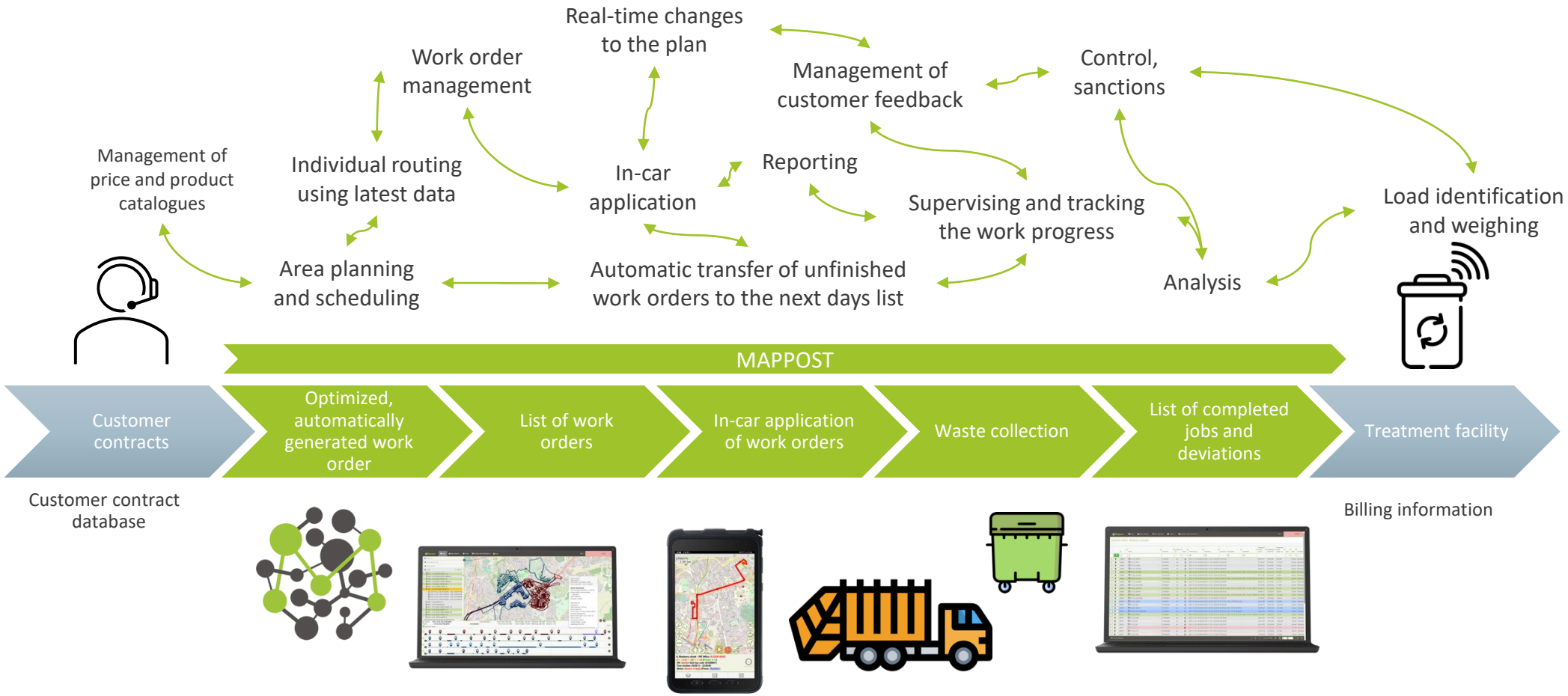


About Mappost

THE PROBLEM

Vehicles	Objects	Obj./route	Possible dispatch scenarios
1	5	5	120
1	10	10	3 628 800
1	25	25	$\approx 1.55 \times 10^{25}$
5	50	10	$\approx 1.52 \times 10^{65}$
10	250	25	$\approx 3.23 \times 10^{493}$
15	4500	300	$\approx 3.41 \times 10^{14487} \rightarrow \infty$

*for reference: stars in the Universe $\approx 10^{23}$

+ Mappost plans routes based on vehicle profiles and load limitations, service time windows, road categories and their mutual priorities, driving speed profiles, regional and legislative restrictions & many other essential factors

Mappost

- **Mappost**, a cloud-based SaaS solution, uses powerful algorithms to solve **high complexity optimization problems** that contain multitude of changing real-life constrains in various business applications
- Provides clients with complete **process control and transparency**, significant **cost reductions**, reduced **CO_2** emissions, ability to react to rapidly changing business process environment
- An outstanding **team of industry experts** with competencies in business process analysis, system analysis, IT development and testing, mathematics, statistics, mapping, geography, GIS and ICT
- Based in **Riga, Latvia**

20% **reduction in logistics costs** from implementing Mappost logistics optimization system

Construction (bulky) waste

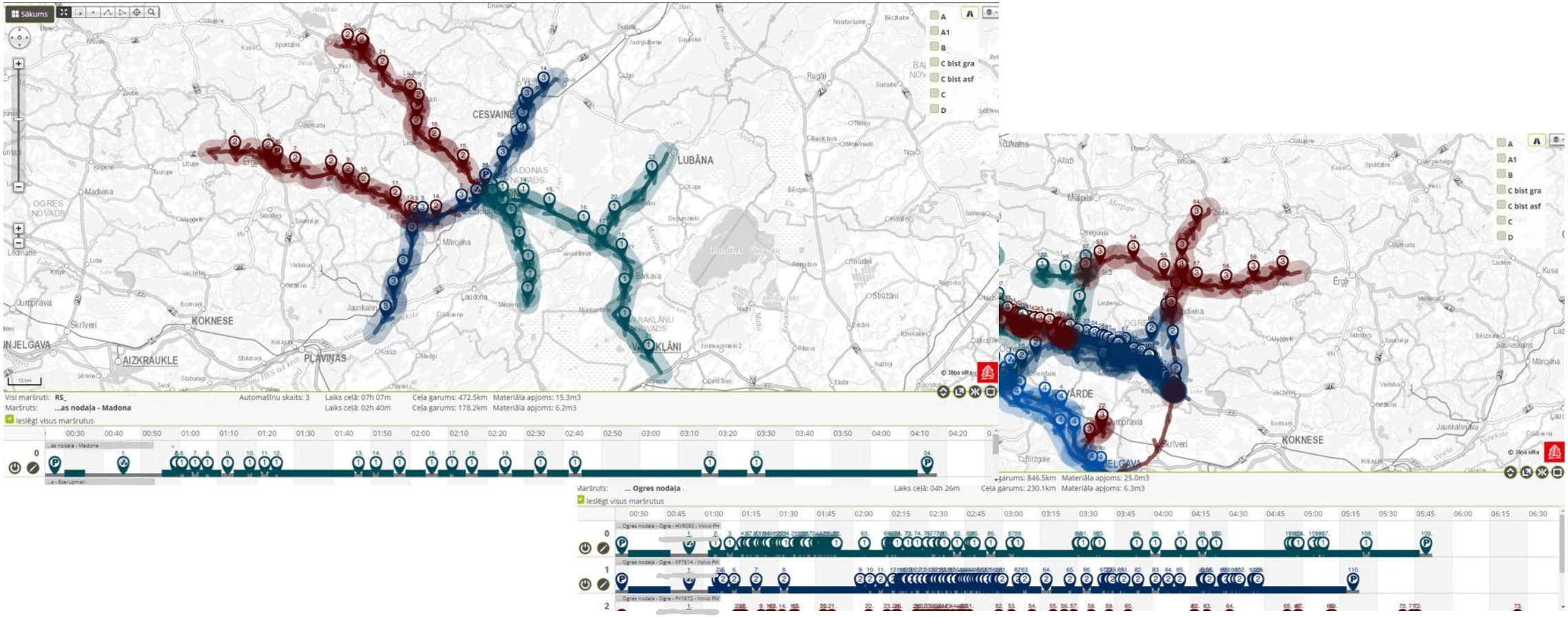
Commercial and industrial waste management

The construction waste sector has a completely different collection and delivery logic, which requires specialized planning algorithms.

With our expertise and experience, we can provide efficient and tailored solutions to construction waste planning optimization.

Road cleaning and maintenance

Road cleaning and maintenance



Other Industries

OTHER INDUSTRIES

- Postal services
- Vending business
- Forestry & Agriculture
- Mining

PROJECTS

- **Country-wide** smart optimization of vending business operations for the largest operator in Baltics, assisting the business in efficiently scaling across Baltic states
- Developed an advanced **timber transportation logistics and optimization solver**, producing optimized work orders on a country scale for 150 timber trucks, >1000 timberyards, >100 clients, 60 assortments, and various other parameters
- Optimizing thousands of deliveries daily of the Latvia's national **postal service** provider
- Experience in pilot projects across **Europe and Asia**

GRAZ ITG

SYSTEMS INTEGRATOR FOR **HOLDING GRAZ** WHICH HAS EUR **587 MIL** TURNOVER

cleanR

EUR **47 MIL** TURNOVER
1300 EMPLOYEES

LATVIJAS PASTS

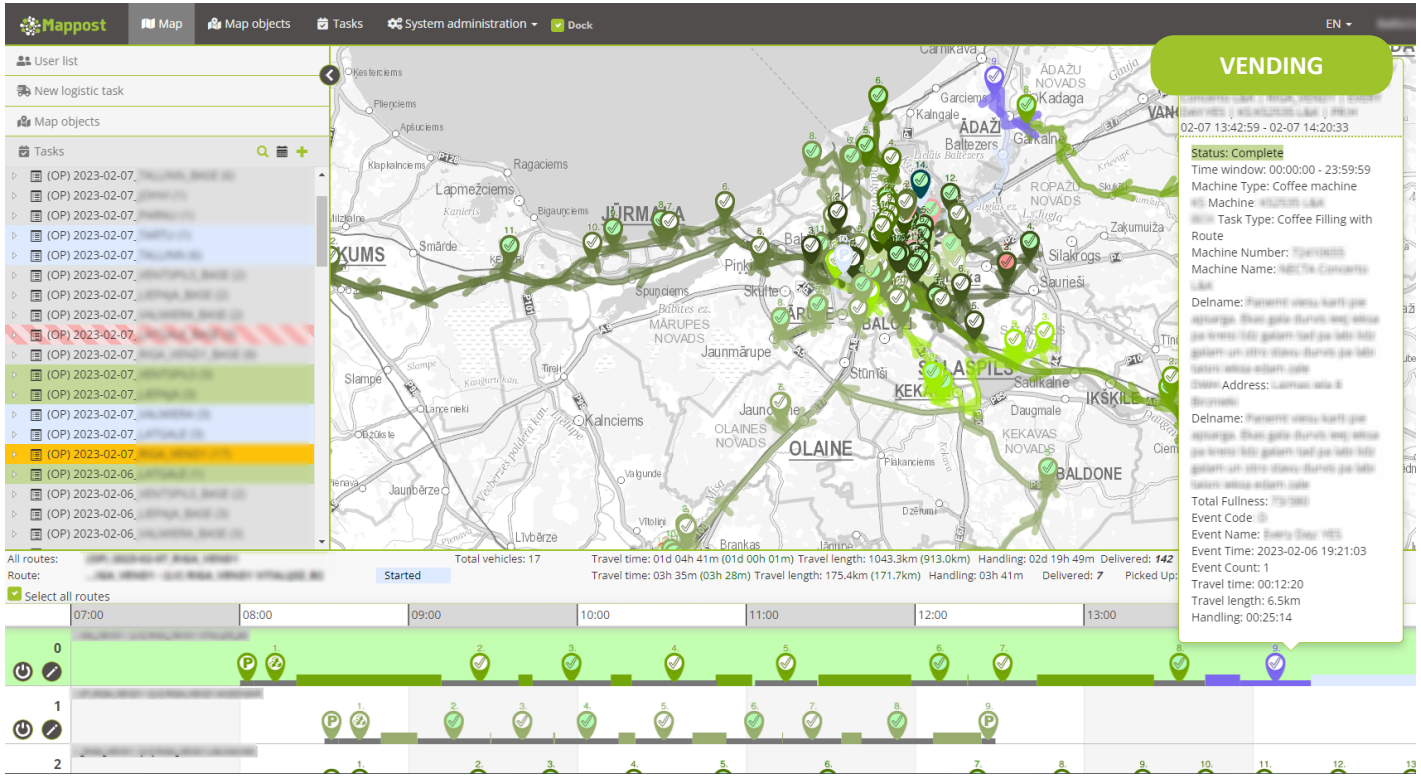
EUR **107 MIL** TURNOVER
3300 EMPLOYEES

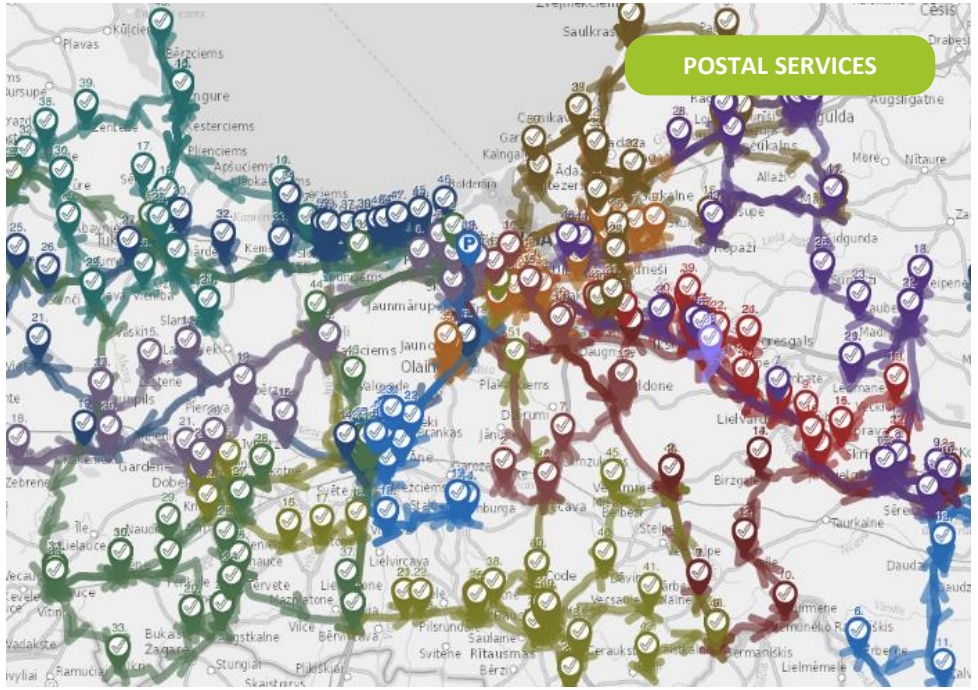
LATVIJAS VALSTS MEŽI
KOKSNE • STĀDI • ATPŪTA

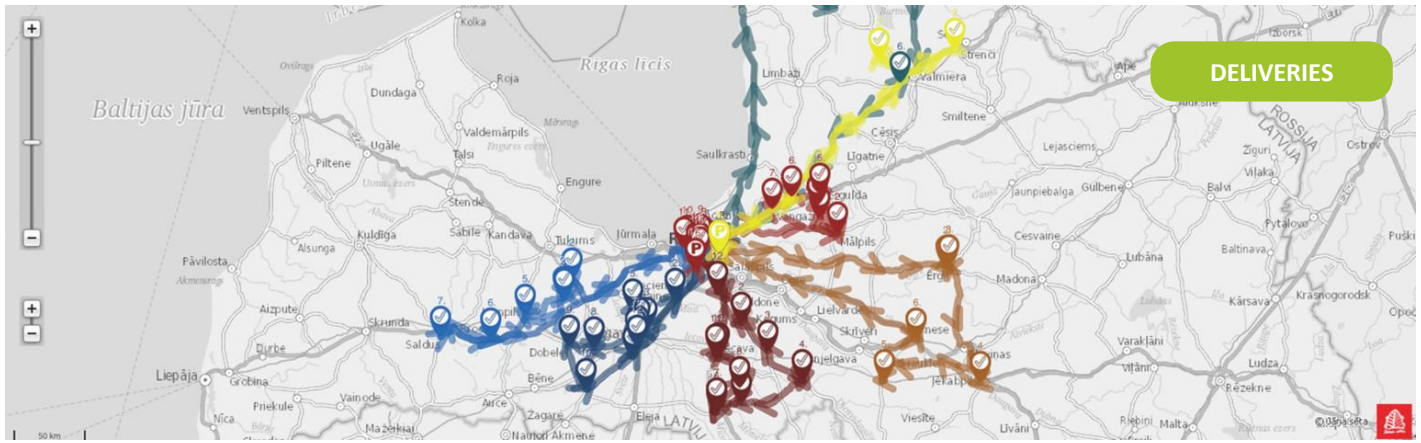
EUR **350 MIL** TURNOVER
1400 EMPLOYEES

COFFEE ADDRESS

EUR **32 MIL** TURNOVER
200 EMPLOYEES


Mappost
Map
Map objects
Tasks
System administration
Dock
EN
User list
New logistic task
Map objects
Tasks
VENDING
02-07 13:42:59 - 02-07 14:20:33
Status: Complete
Time window: 00:00:00 - 23:59:59
Machine Type: Coffee machine
Task Type: Coffee Filling with Route
Machine Number:
Machine Name:
Delname:
Address:
Delname:
Total Fullness:
Event Code
Event Name:
Event Time: 2023-02-06 19:21:03
Event Count: 1
Travel time: 00:12:20
Travel length: 6.5km
Handling: 00:25:14
All routes:
Total vehicles: 17
Travel time: 01d 04h 41m (01d 00h 01m) Travel length: 1043.3km (913.0km) Handling: 02d 19h 49m Delivered: 142
Route:
Started
Travel time: 03h 35m (03h 28m) Travel length: 175.4km (171.7km) Handling: 03h 41m Delivered: 7 Picked Up:
Select all routes
07:00
08:00
09:00
10:00
11:00
12:00
13:00


POSTAL SERVICES


DELIVERIES
Baltijas jūra
Rigas līcis

WASTE MANAGEMENT

What drives the need for changes?

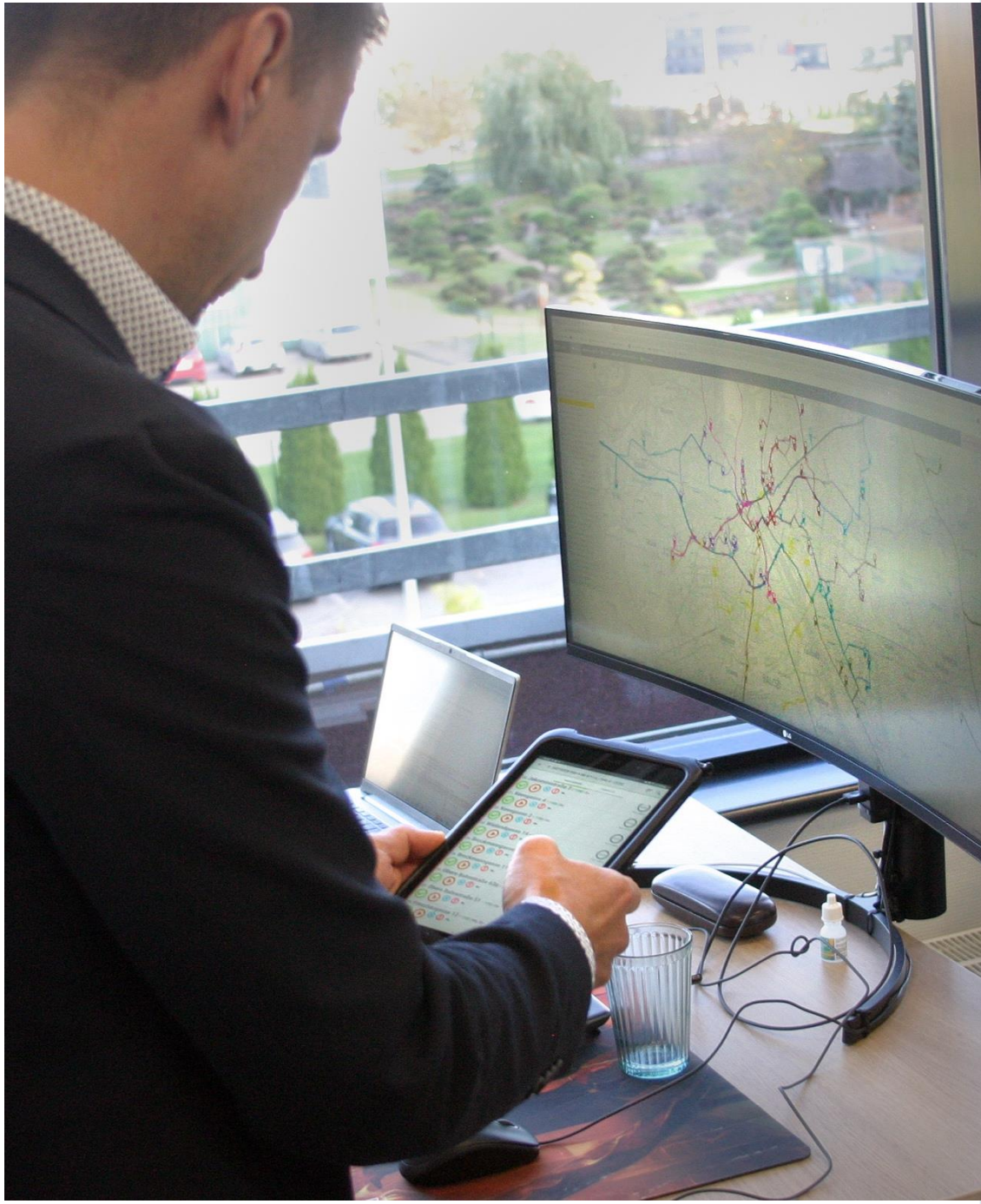
New government regulations and EU legislation

Customer demands and expectations for high-quality and real-time waste management services

Emphasis on waste separation and recycling

What drives the need for changes?

- Necessity of real-time reporting to increase service quality
- Pricing and customer service level agreements (SLAs)
- Growth of new regions and urban areas



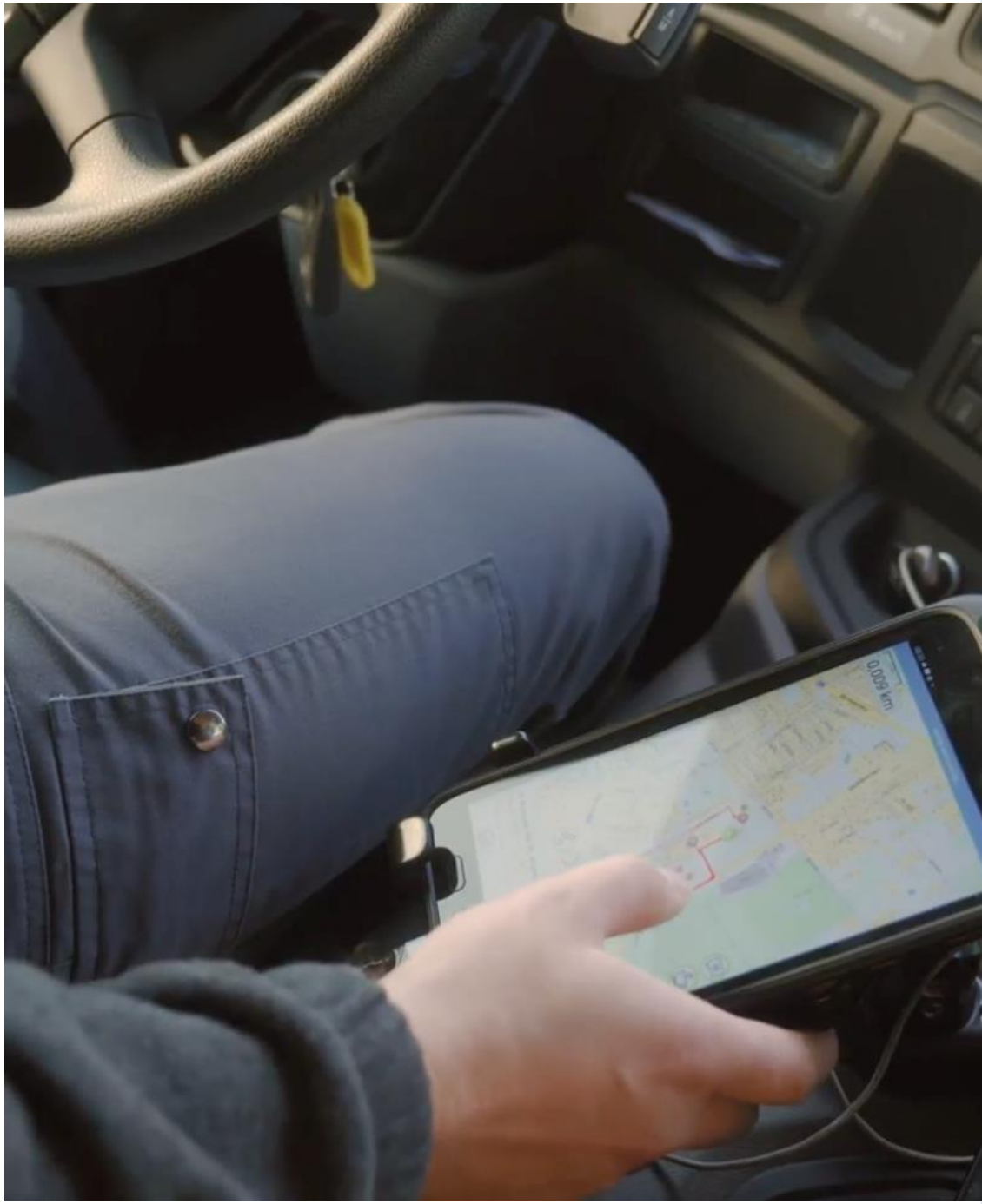
What drives the need for changes?

- Modernization of waste management fleet and fuel sources
- Pressure from customer satisfaction and public demand for sustainable waste management practices
- Expert human resource shortage, leading to reliance on experienced industry veterans

What drives the need for changes?

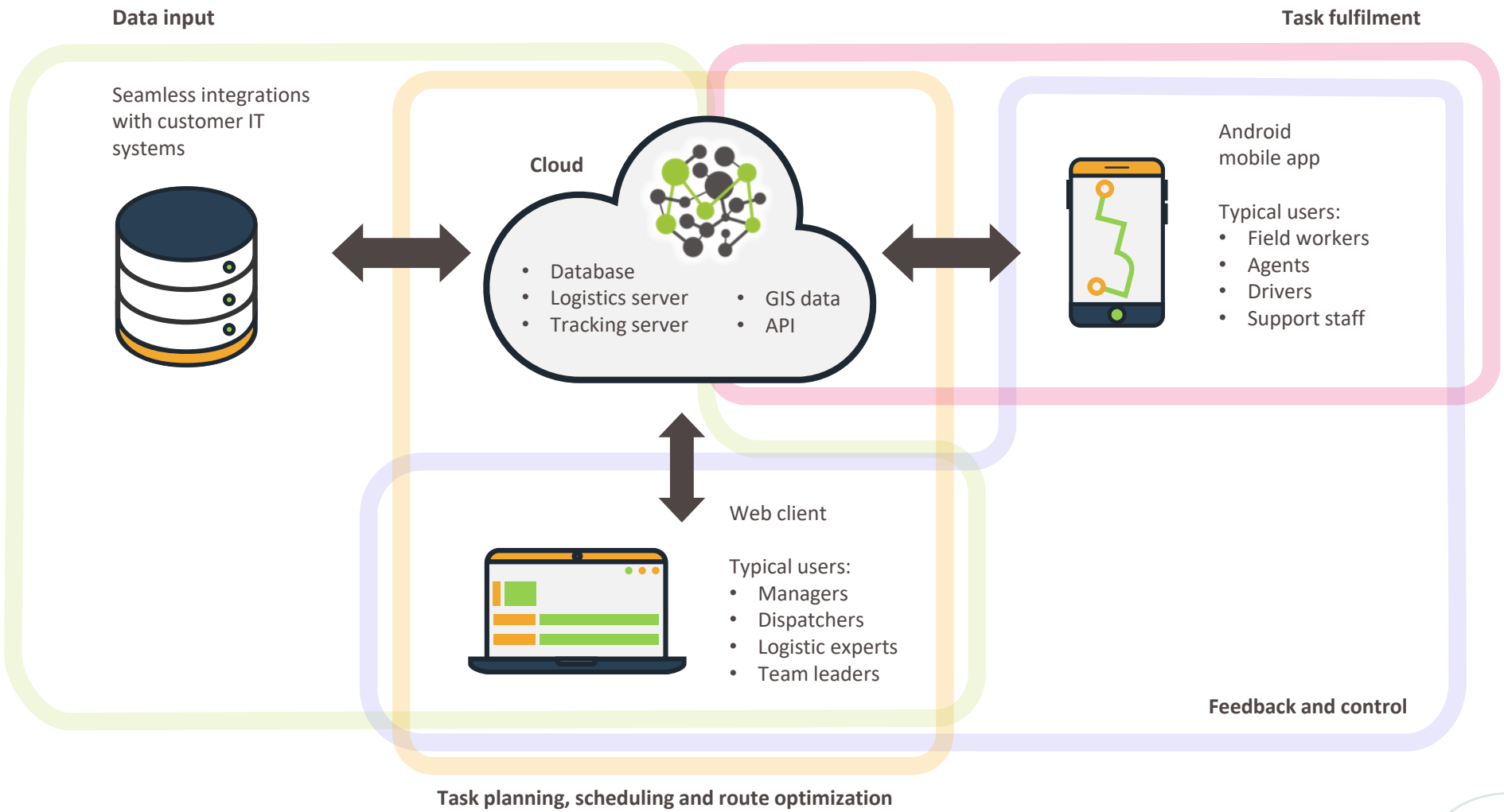
Need to shift from infrequent, fixed waste collection schedules to more complex and efficient systems

Cost constraints that force optimization of waste management processes

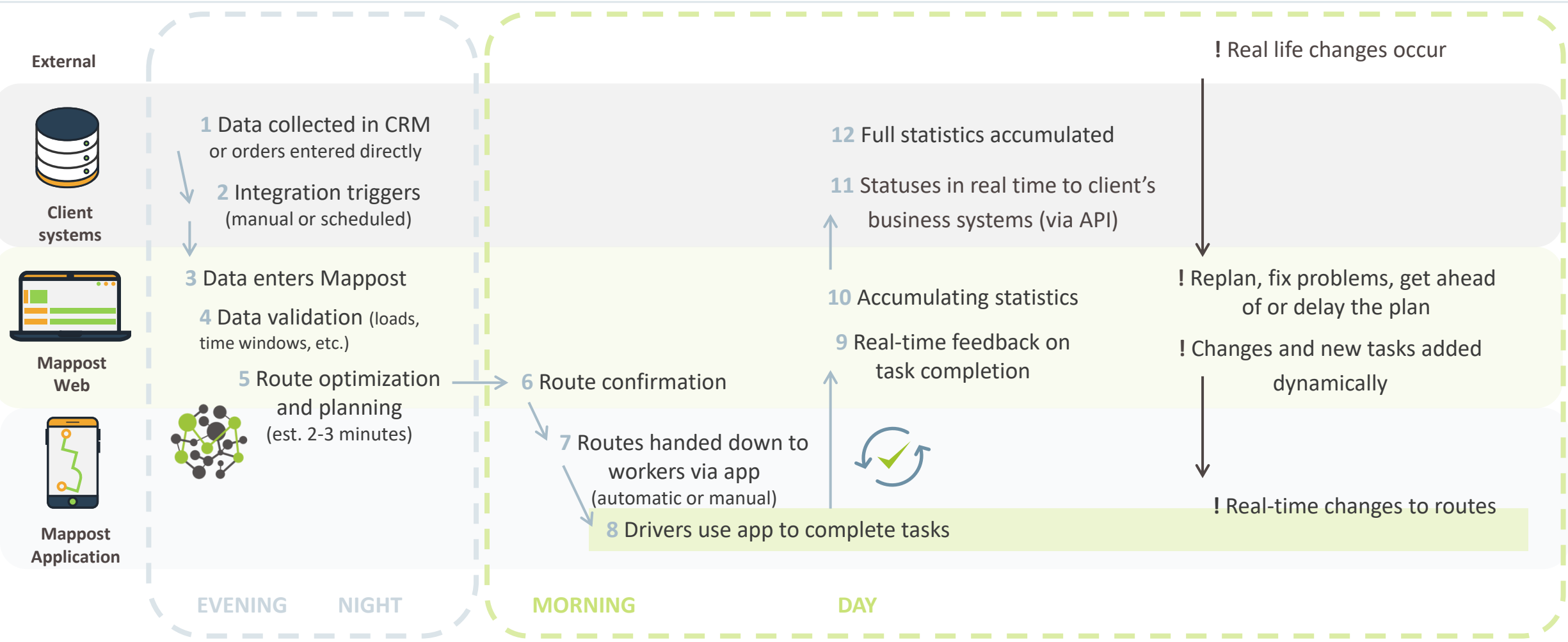


How does Mappost help to solve these problems?

Cloud-Based Solution



Typical Daily Process



Mappost App Features

Android application used by drivers

- Receive geolocated tasks with detailed approach instructions (incl. gate codes and keys, notes, additional volumes to be collected, etc.)
- Record task completion
- Record issues encountered at each collection point with comments and photo evidence (wrong waste sorting, unreachable bin, etc.)
- Record lunch breaks
- Specify the exact bin locations
- In case of unplanned visits to landfills, remaining tasks are automatically reoptimized and reassigned

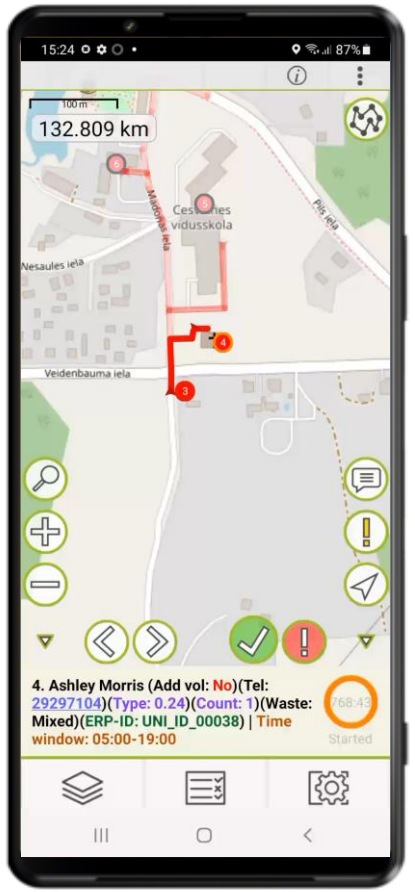
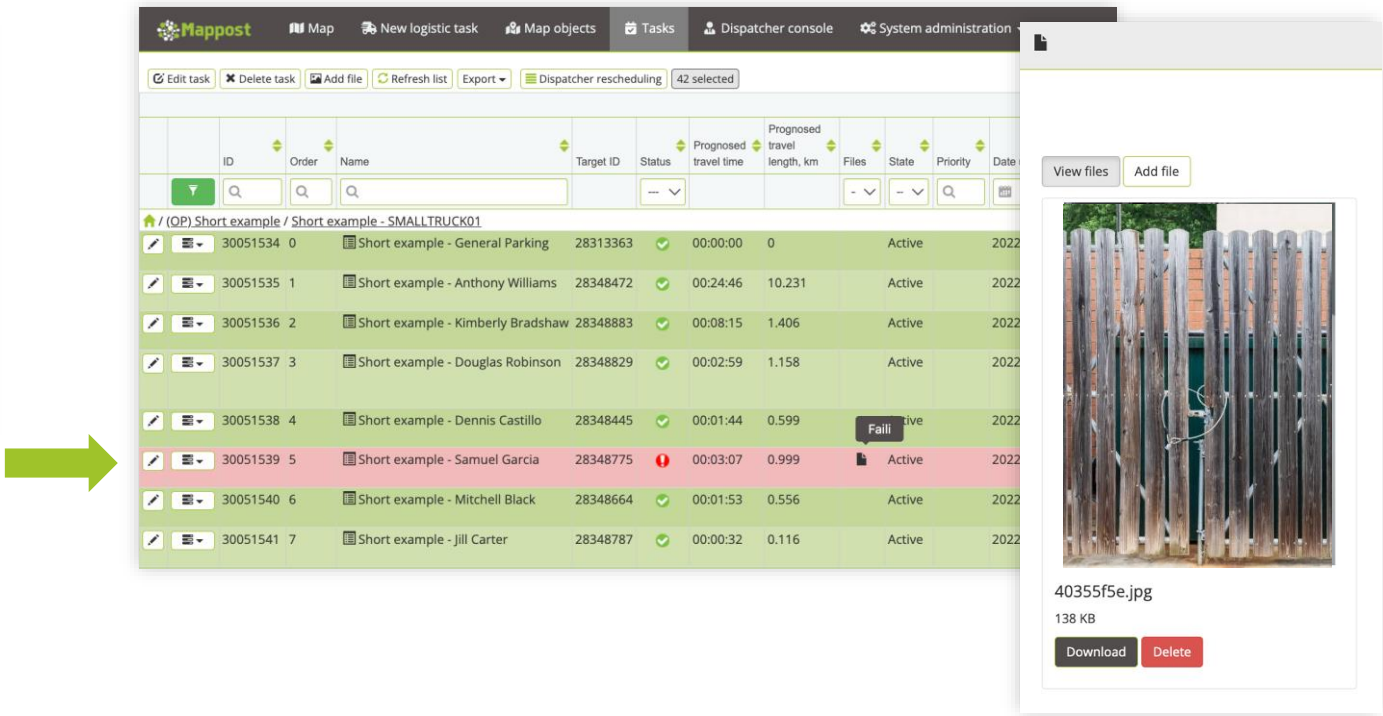


Photo Evidence

When registering a problem in the mobile app, it is possible to add an image as a proof. The image is captured by the camera of the device and is immediately available on the Mappost web platform.



Weighting & RFID

Weighting and RFID statistics

RFID support: comparing expected and received RFID data to detect discrepancies and alert to any issues, analysis of expected vs received location differences.

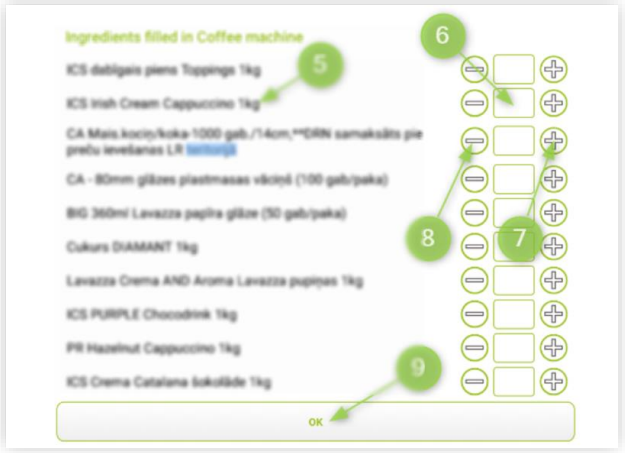
Ensures that all waste is collected and transported correctly, reducing the risk of errors and improving overall efficiency.

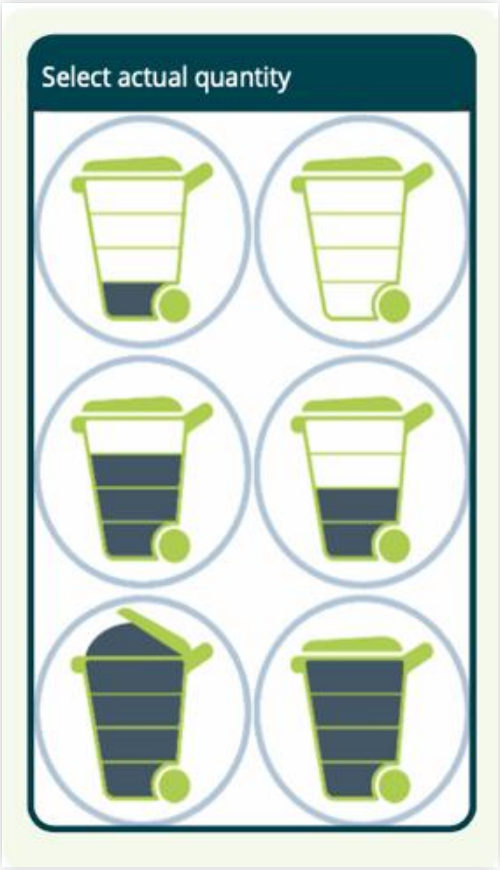
Input of Collected Volume

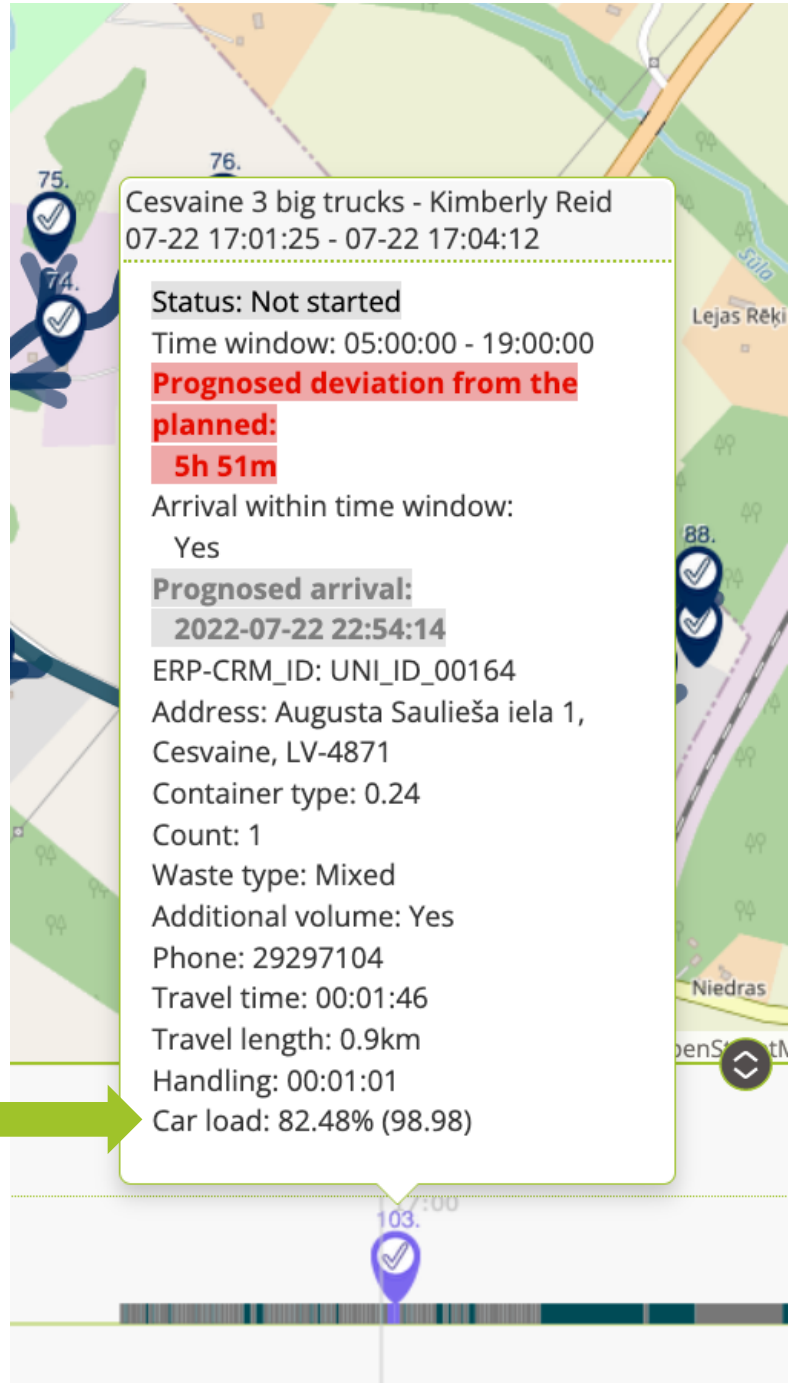
In each object, the driver can enter the amount collected using the mobile app.

The entered volumes will automatically be available on the Mappost Web platform, where this data can be used for further calculations and purposes (e.g. billing).

Various custom visual solutions for volume input are possible.







Vehicle Capacity Planning

Mappost predicts the need for waste discharge

The distribution of vehicles by routes takes into account the capacity of each vehicle, as well as the expected amount to be collected at each object.

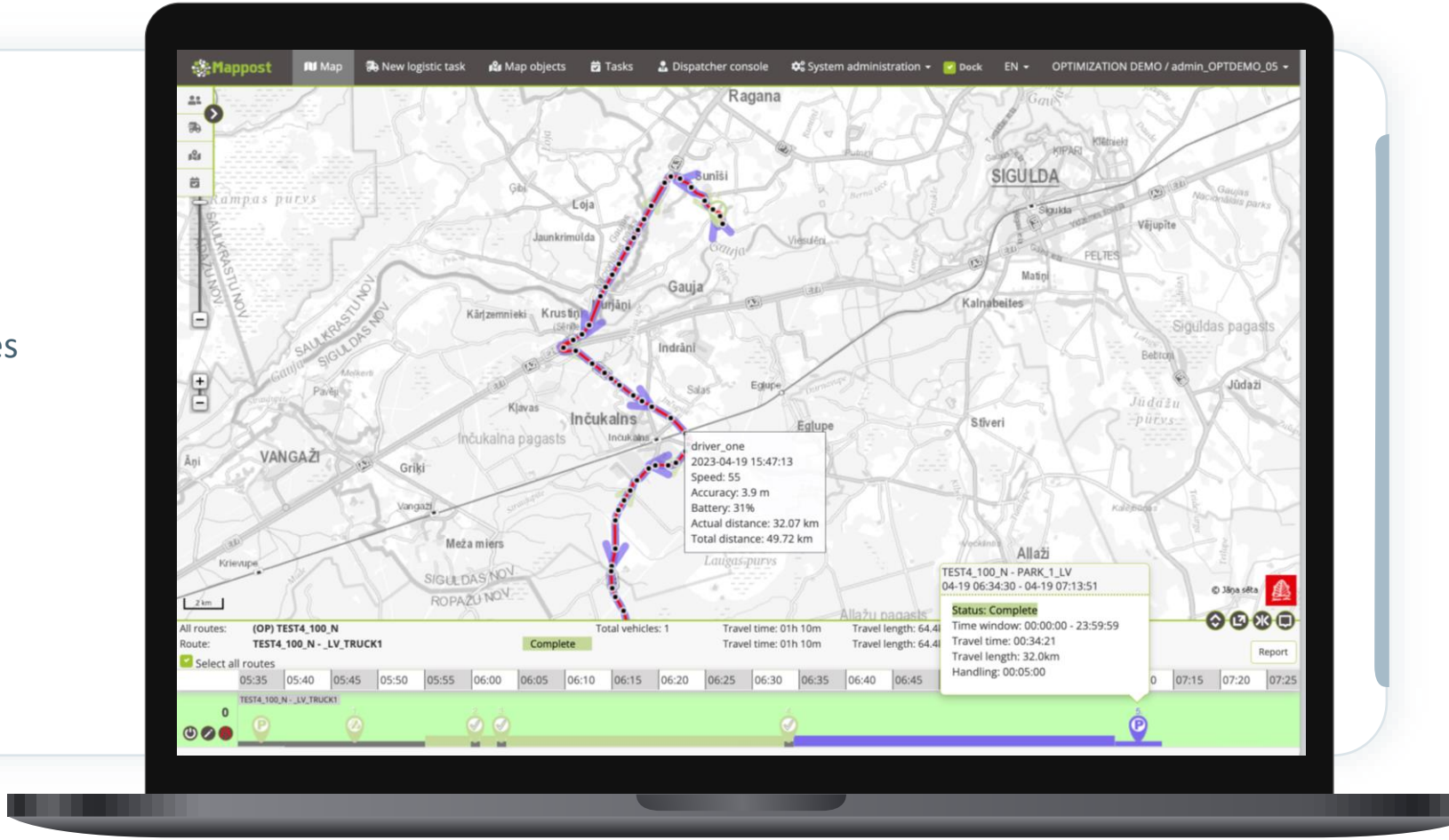
In addition, Mappost Android application allows drivers to make unplanned visits to landfill in case trucks become full sooner than expected. Mappost records such changes and replans and reassigns routes and remaining objects.

GPS Tracking

In Real-time

Monitor field workers and track progress on the road or on site in real-time with GPS data from mobile devices

Mappost not only collects GPS data from mobile devices to track progress on the go but also stores this data to enable viewing and analyzing past activities and identify areas for improvement.



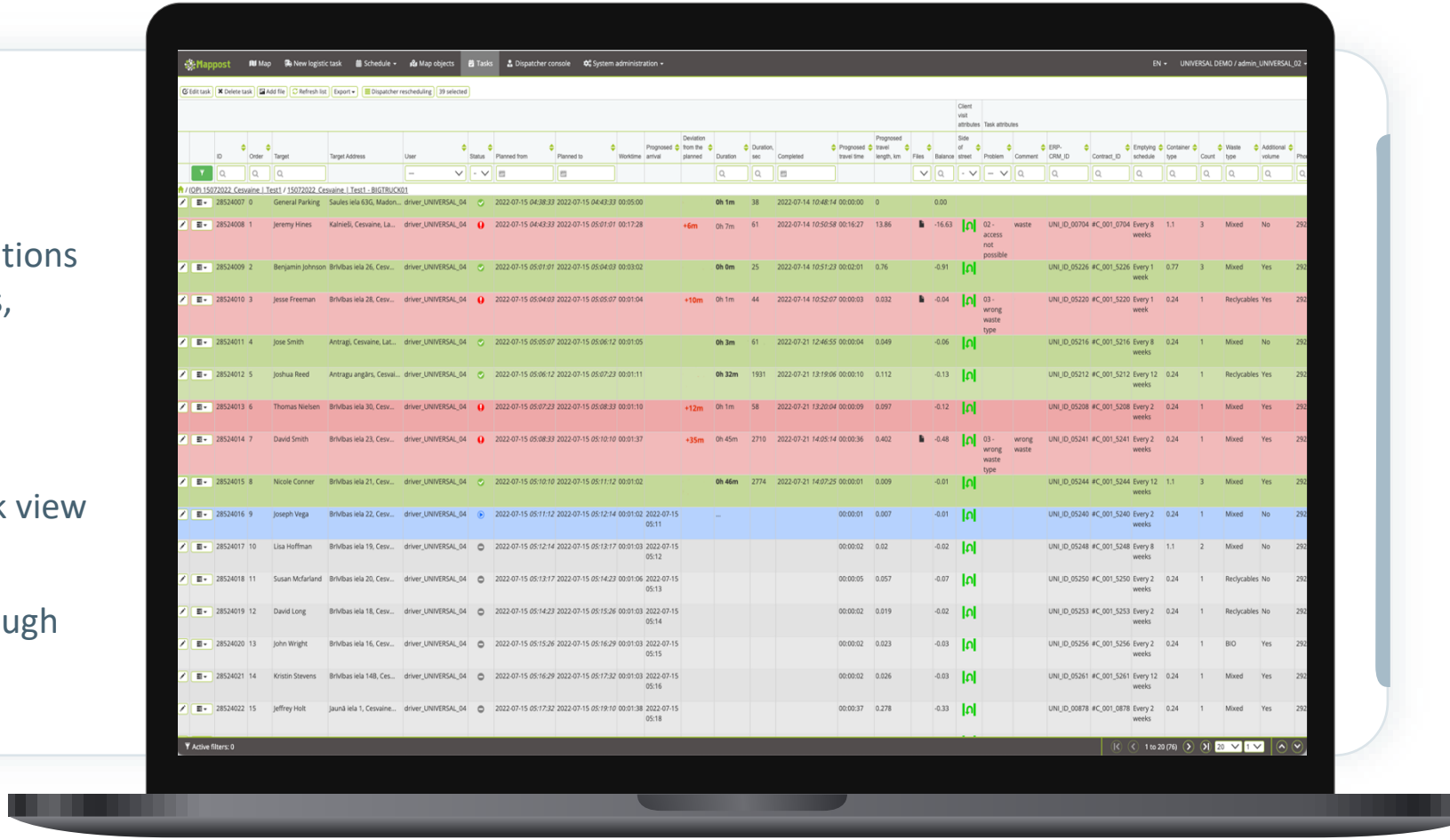
Reports and Analysis

Problem catalogue

Receive task customized status notifications about completion, delays, and changes, including photos from client or task locations.

Visual indicators in the map view and detailed information in the tabular task view for comparing fact vs. plan.

Automatic problem warnings (e.g. through email).

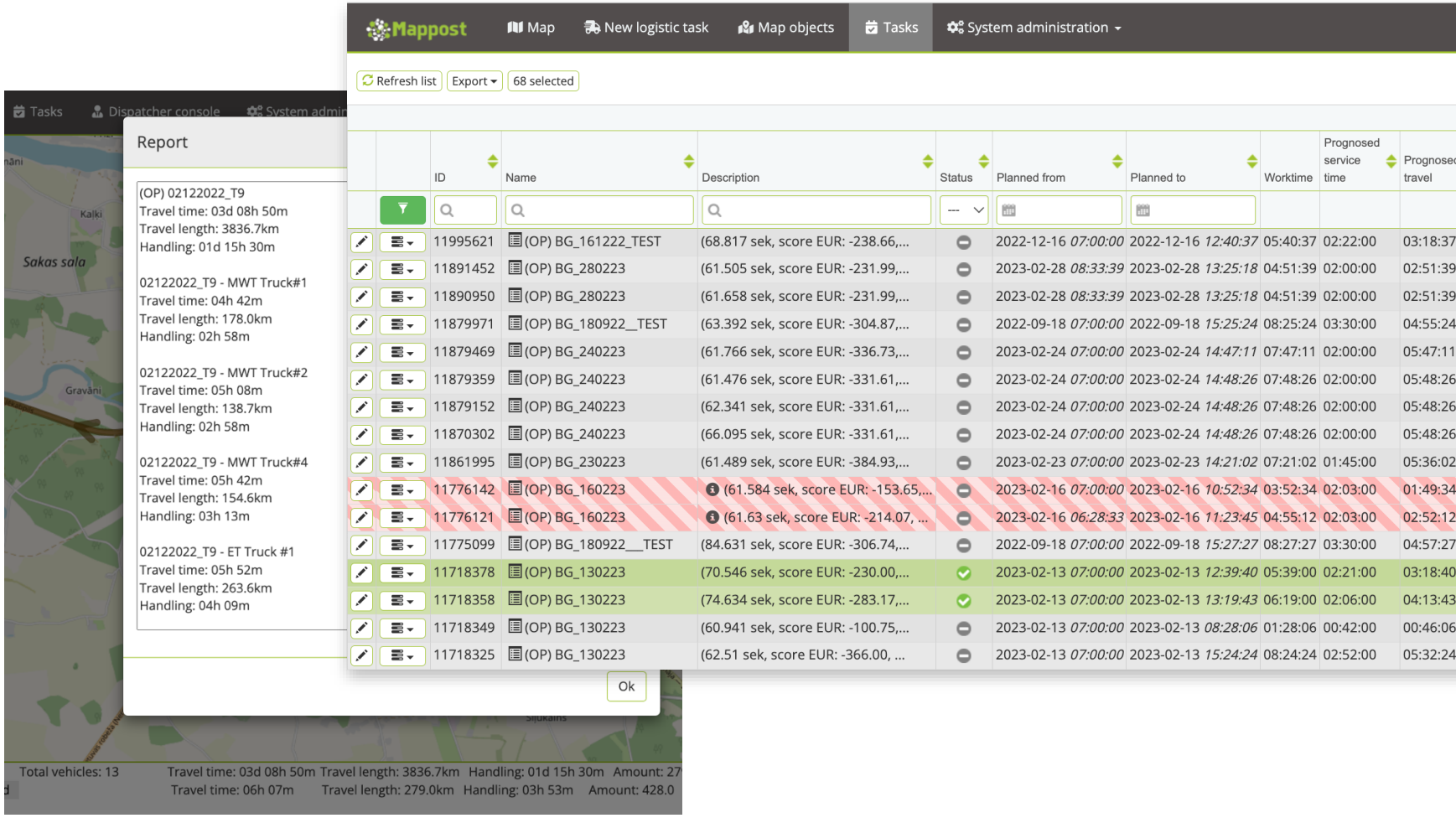


Calculations of savings

As we use Score (total cost) parameter to evaluate routing scenarios, it is easy to simulate and compare scenarios using the same paramater.

Detailed statistics are available for each route separately and jointly for all daily routes with the planned costs (Score), mileage, time, volume, etc.

Basis for making informed data-based decisions.



All waste types in a single platform

Create personalized material catalogues to let Mappost distinguishing between waste types and the respective landfills/recycling facilities they must be delivered to.

Name EN	Name RU	Name EN	Name DE	Name EE	Name LT
Materiāls/Klase	**Materiāls/Klase**	**Materiāls/Klase**	**Materiāls/Klase**	**Materiāls/Klase**	**Materiāls/Klase**

All lists | Add New | Zone catalogue | Material catalogue

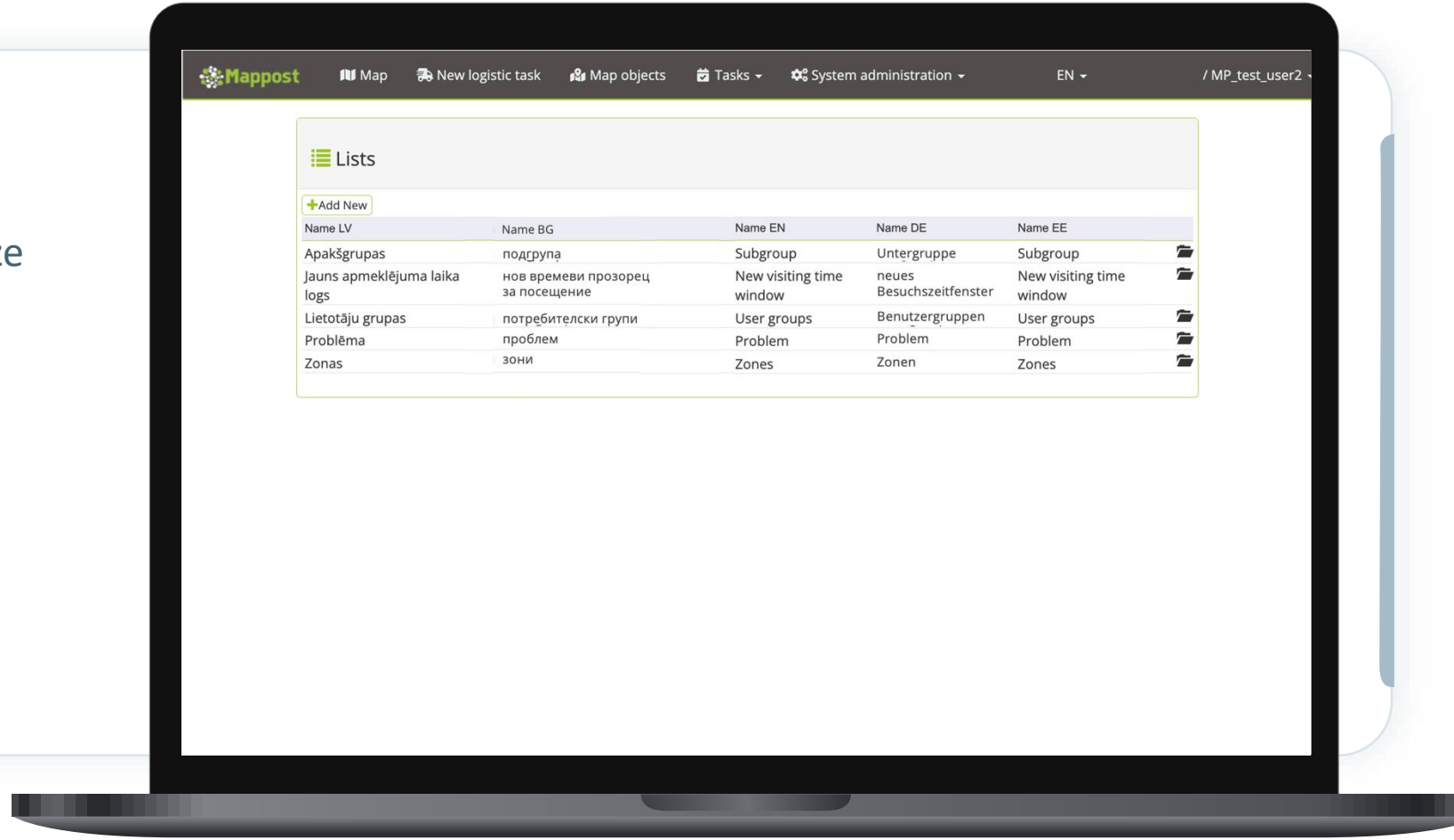
Value	Name EN	Name DE
5	Construction waste other than 170901, 170902 and 170903	
21	Metals	
1	Heavy ash, slag and soot, which do not correspond to class 100104	
2	Wooden packaging.	
6	Waste from the mechanical treatment of waste (including mixtures of materials) not corresponding to class 191211	
18	Soil and rocks not covered by class 170503	
7	Wood, Construction and demolition waste	
8	Concrete, brick, tile, tile, ceramic mixtures that do not correspond to class 170106	
9	Concrete	
23	Mixed packaging	
10	Bulky waste	
22	Biodegradable waste	
17	Unsorted household waste	
16	Glass	
19	Plastic and rubber	
11	Fabric packaging	
12	Building materials containing asbestos7	
90	Other solid waste from gas treatment, which does not correspond to class 101312 - is not dangerous.	

Localization

Interface in your language

We offer the flexibility to customize our platform to any preferred language, including Bulgarian.

With our multilingual interface, you can streamline your waste collection process and focus on what matters most – running your business.



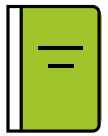
Implementation process

PRELIMINARY ANALYSIS

PILOT PROJECT

TERRITORY EXPANSION

TRAINING



FULL-SCALE IMPLEMENTATION

REGULAR SUPPORT

Resources

eBooks

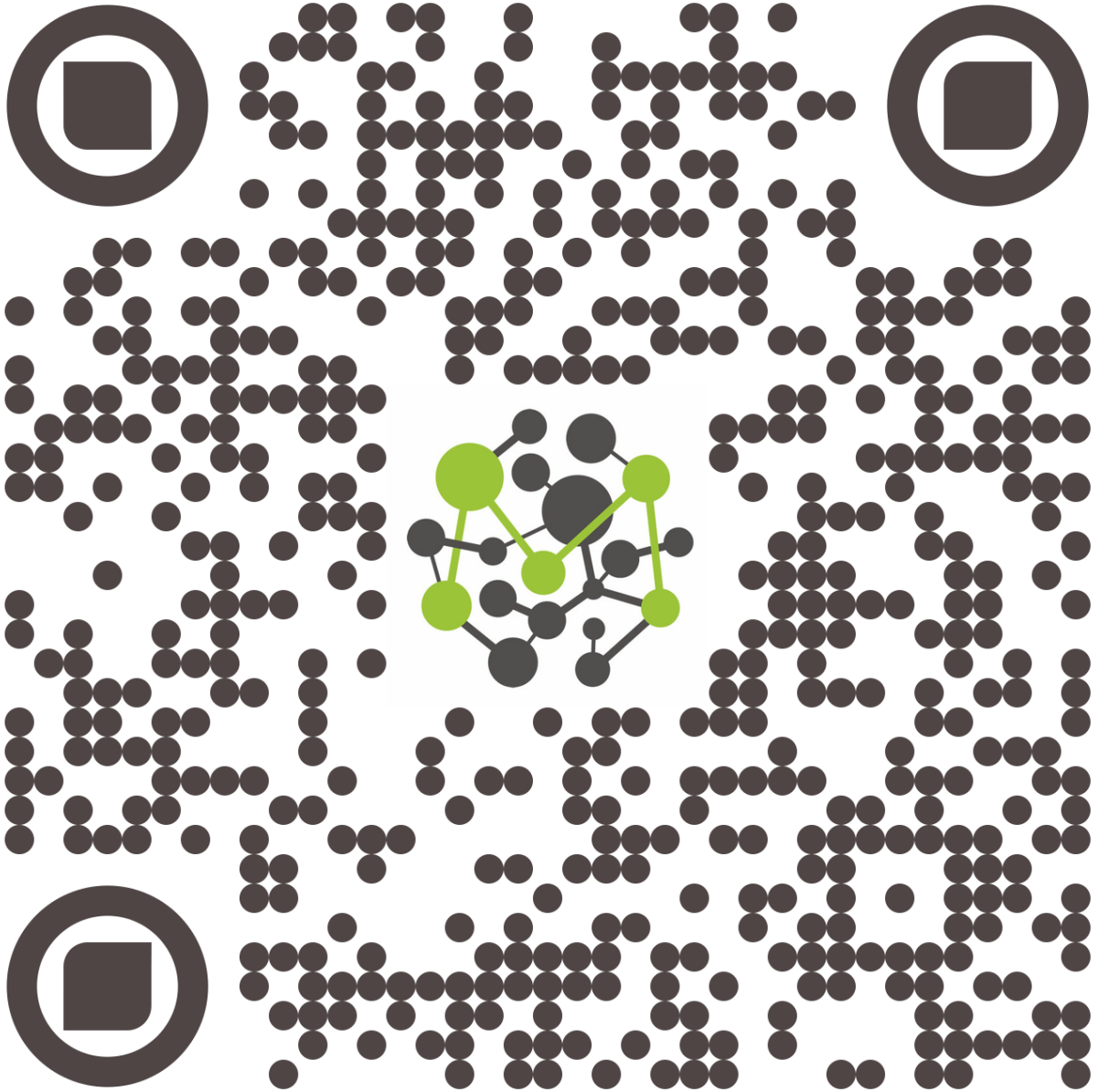
Case studies

https://info.mappost.eu/resource/

We look forward to your questions!

info.mappost.eu

Contact us at: office@mappost.eu

Get in touch with us!

Scan the QR code to share your opinion and receive our free materials.