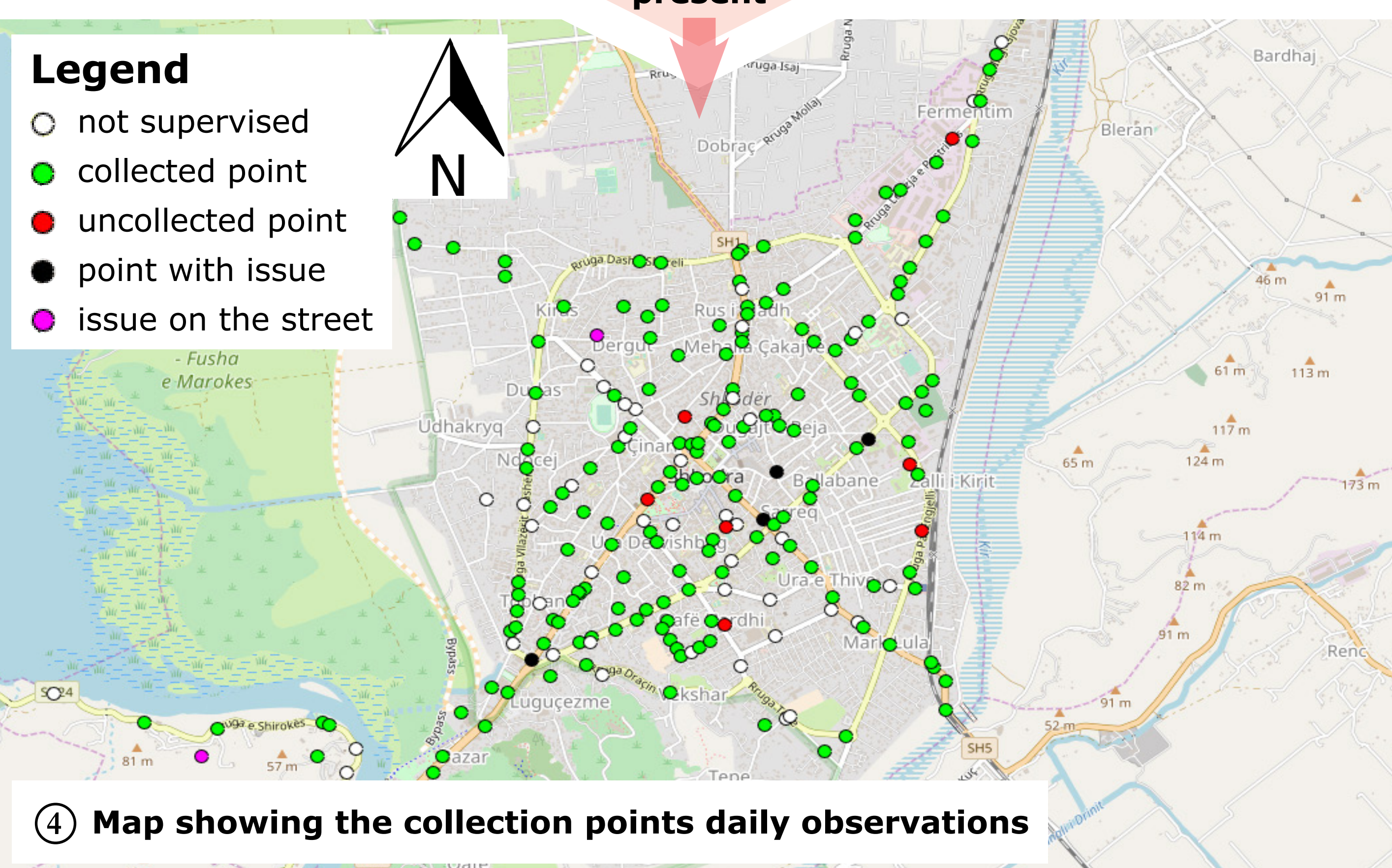
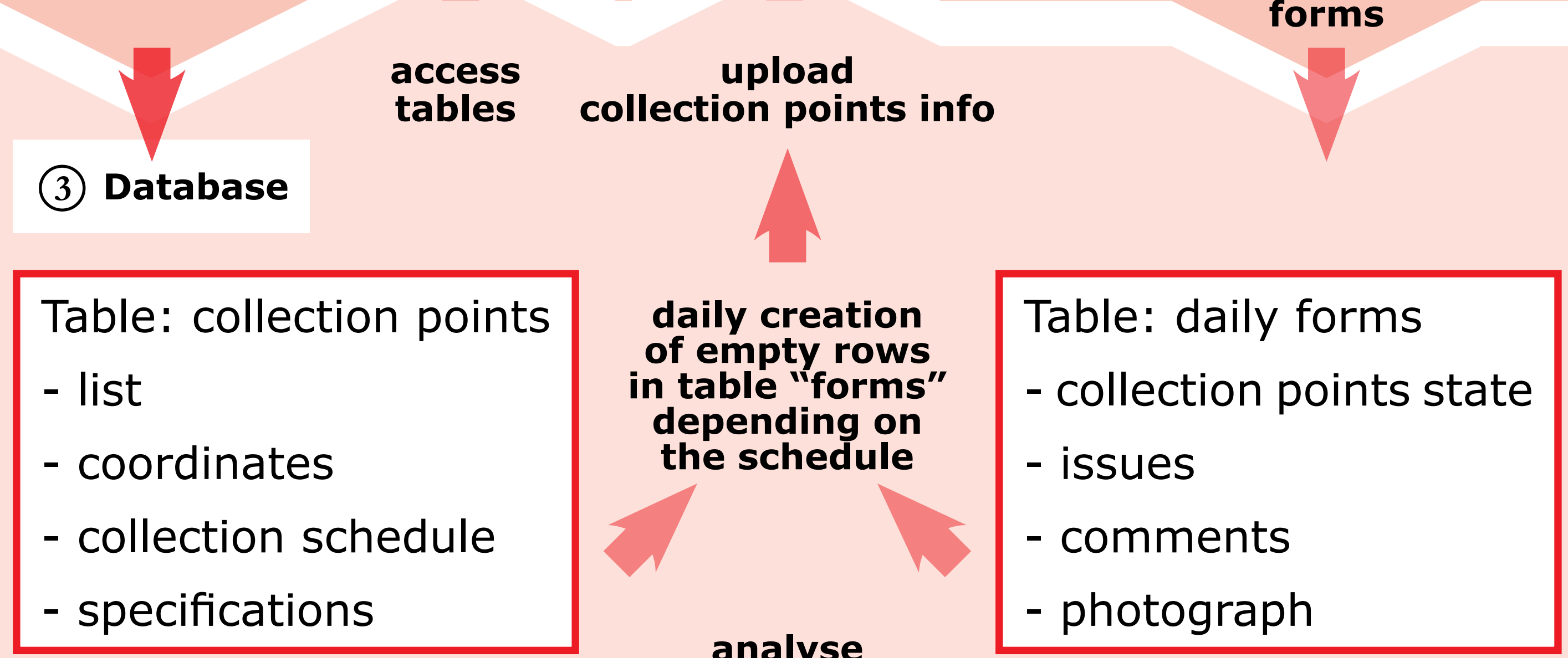
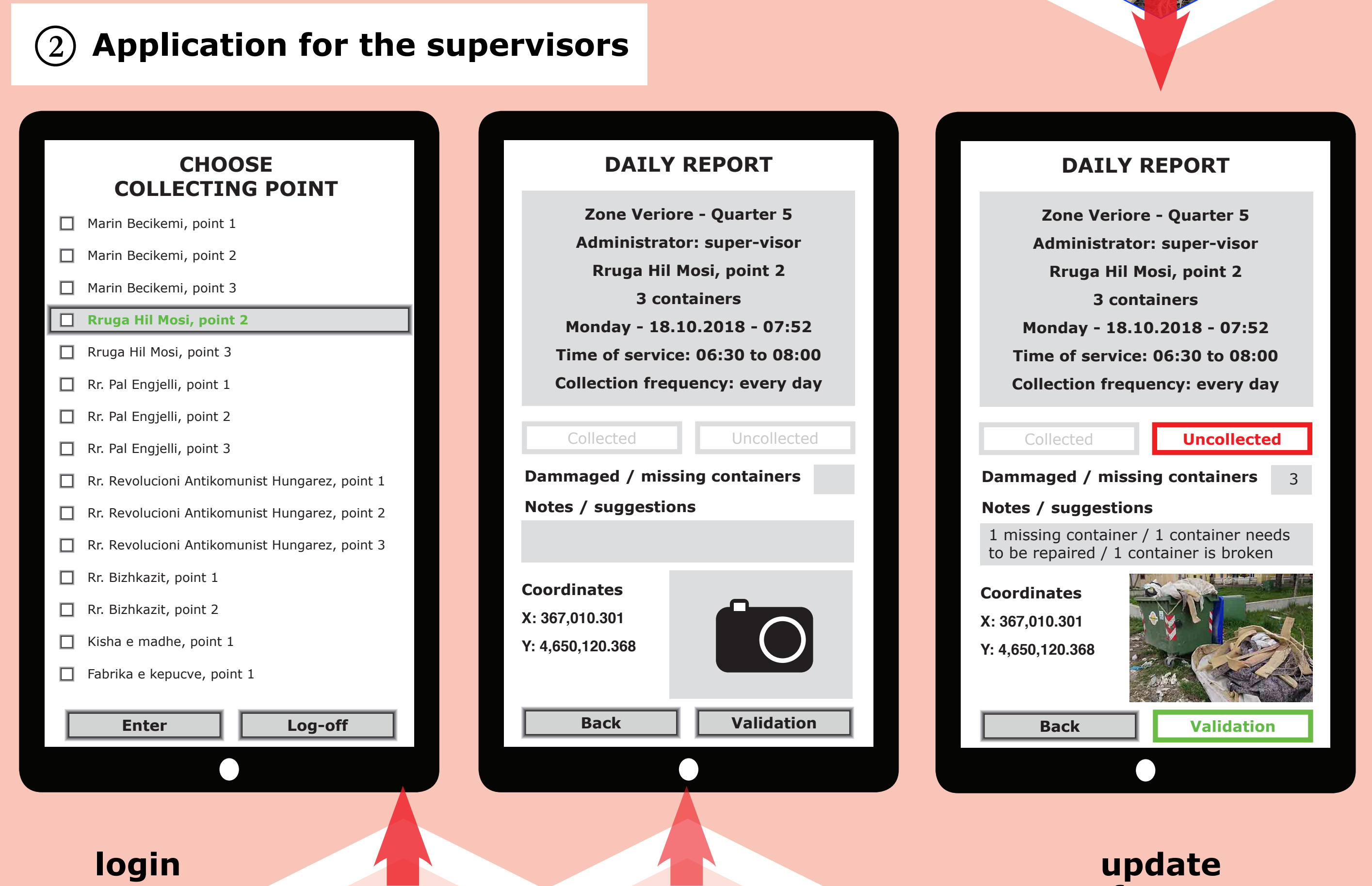


# Development of a monitoring system to improve the management of waste services within the municipality of Shkodra, Albania

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## Outline of our solution



## Waste management issues in Shkodra ①

The main problem of the municipality is the lack of a reliable monitoring system to ensure that garbage collection is done properly. Currently, 20 supervisors record the work provided by the garbage collectors. But these recorded data are too numerous to be either digitised or exploited. And streets become dirty as waste is left uncollected.

## Objectives of the monitoring system ②,③,④,⑤,⑥

- Coordination of waste collection
- Supervision of the work done by the garbage collectors/supervisors
- Supply of information for the maintenance of the bins
- Transparency towards municipality, service providers and citizens

## Application for the municipality supervisors ②

- Write and read the data of the collection points in the database
- Take and store pictures when there is an issue at a collection point
- Verify time and location of completion

## Database ③

- Login informations for access to the database
- Information about the collection points
- Forms for the daily reports

## Daily output ④

- A map updated daily presenting the state of the collection points
- Citizens can get more transparency
- Service provider gets the ability to act fast and precisely

## Monthly output ⑤

- Summary of the forms over one month
- It monitors the service providers performance
- It provides evidence of negligence when needed

## Action ⑥

- Outputs are the basis for taking the necessary measures
- Municipality can act either directly or instruct the supervisors/garbage collectors

## ⑤ Monthly statistics of the supervision

- Number of forms to fill in
- Number of supervisions done
- Number of points collected
- Number of issues
- Percentage supervised
- Percentage collected
- Percentage of issues

## ⑥ Action

- Repair bin
- Supervisor warning
- Add collecting point
- Change bin
- Waste collector penalty
- Suppress collecting point

## Further developments

During this project, we have been able to produce several elements of the complete supervision system. All these scripts and commands in a computer terminal will have to be automated to achieve effectiveness. This implies producing a server that could be the interface between the database and the application and that would help the database management. Once the whole system will be in place, it will be necessary to maintain and adapt it to the evolutive needs of the municipality. It could also be deployed to other municipalities facing similar issues.

