BEUTH HOCHSCHULE FÜR TECHNIK BERLIN
University of Applied Sciences

A traffic management system based on Graphhopper and OpenStreetMap

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MAGDa
Management & Analyse Geotemporaler Daten

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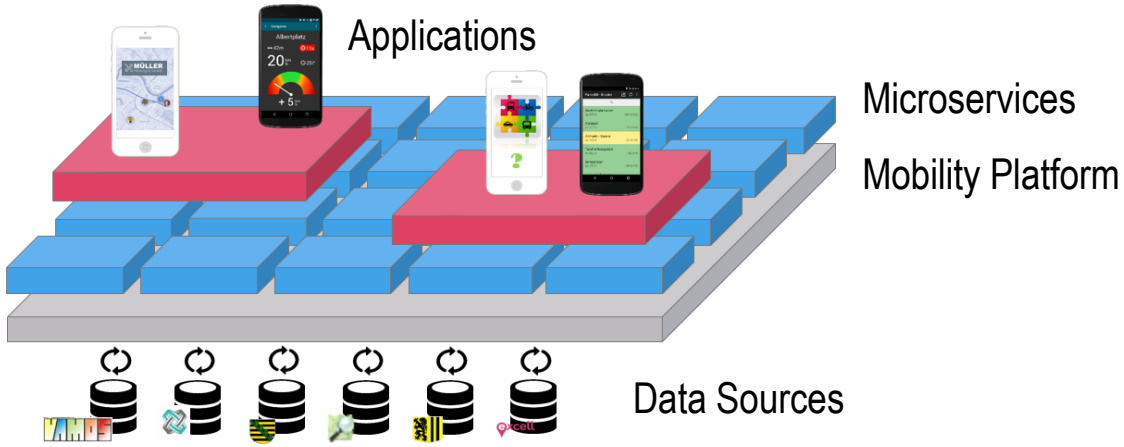
About Research Project ExCELL

- Funded by the Federal Ministry for Economic Affairs and Energy and the German Aerospace Center (DLR)

- Goal: Mobility service platform
  - Based on Open Data / Crowdsourcing
  - Open web service APIs
  - Apps / Products

- Target groups:
  - SMEs
  - Start ups / Developers



Technology choices

Road Network

Routing

Map Matching

Travelling Salesman

Geocoding

Prediction

PostGIS

Technology choices

OSRM
OPEN SOURCE ROUTING MACHINE

openroute service

Graphhopper

Itinero

OptaPlanner

OpenTripPlanner
Multimodal Trip Planning

jsprit

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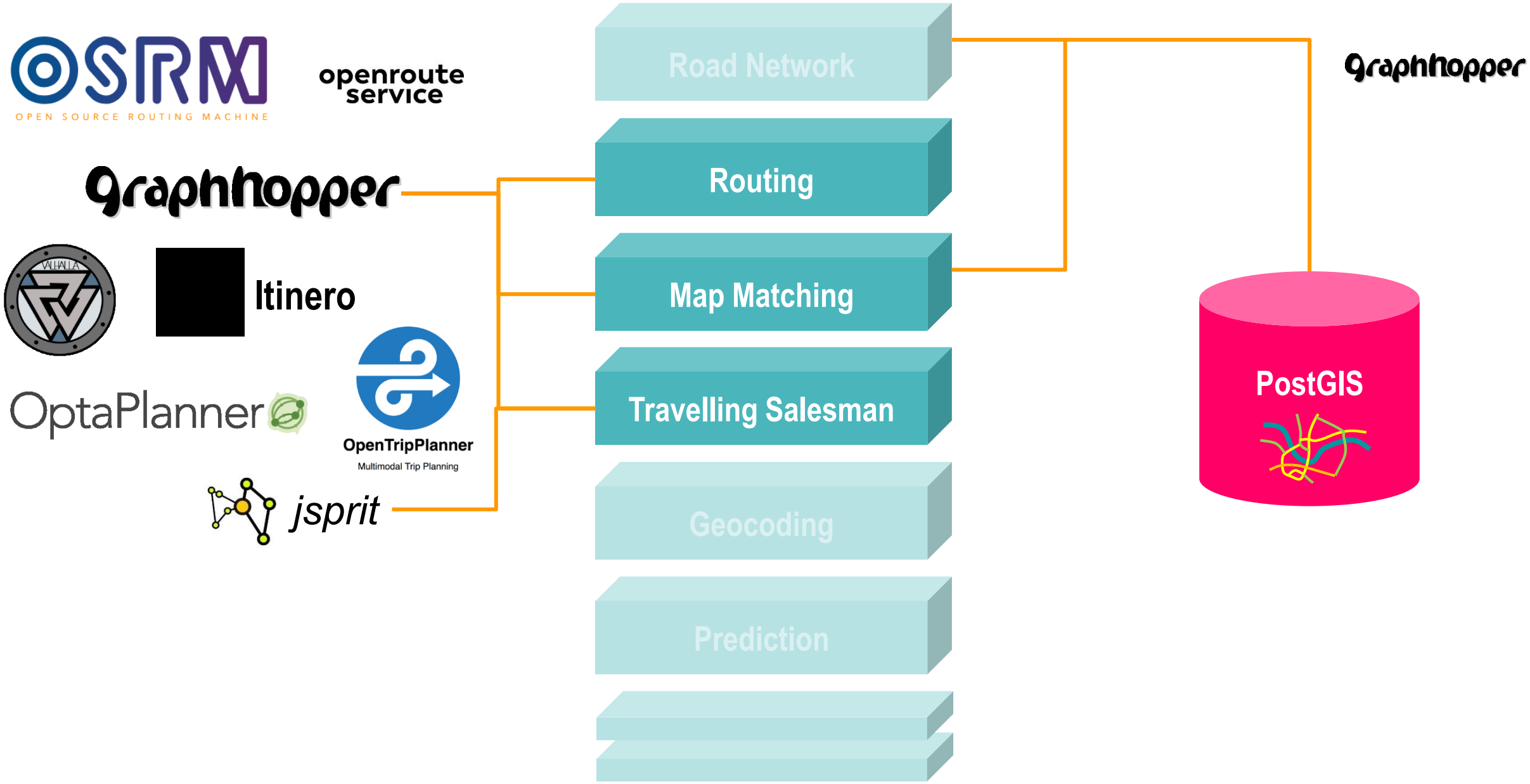
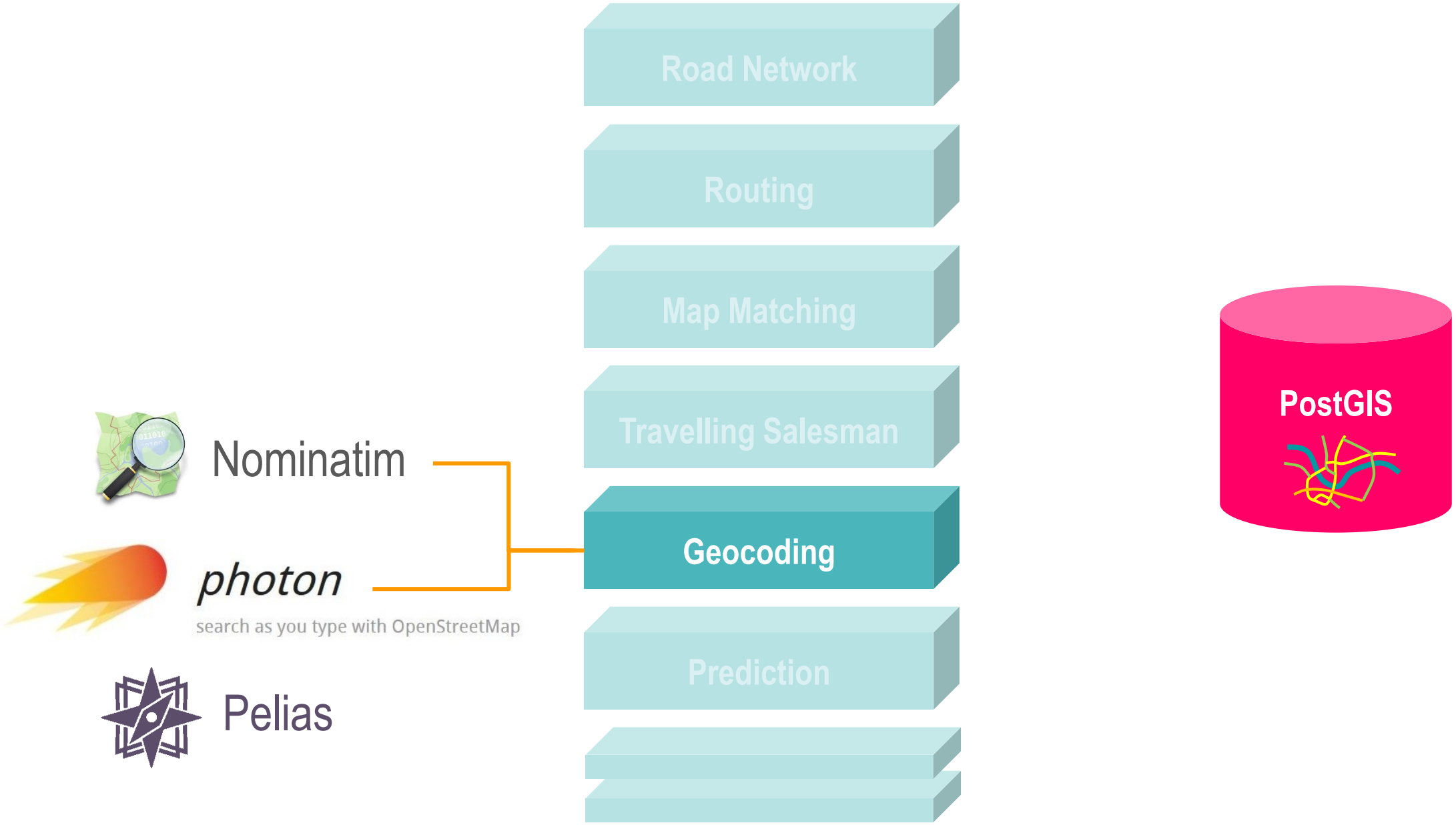
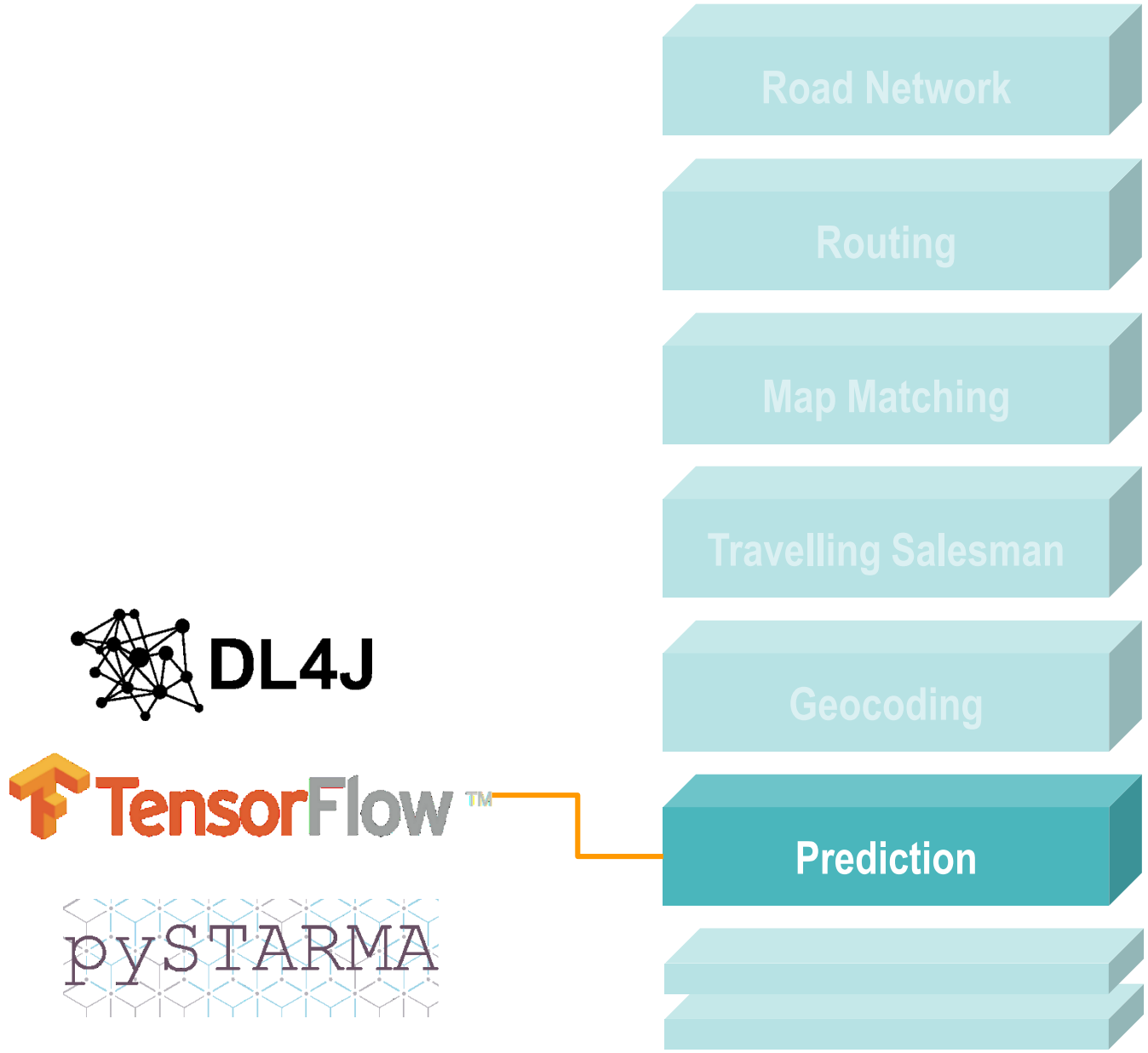
Technology choices



Technology choices

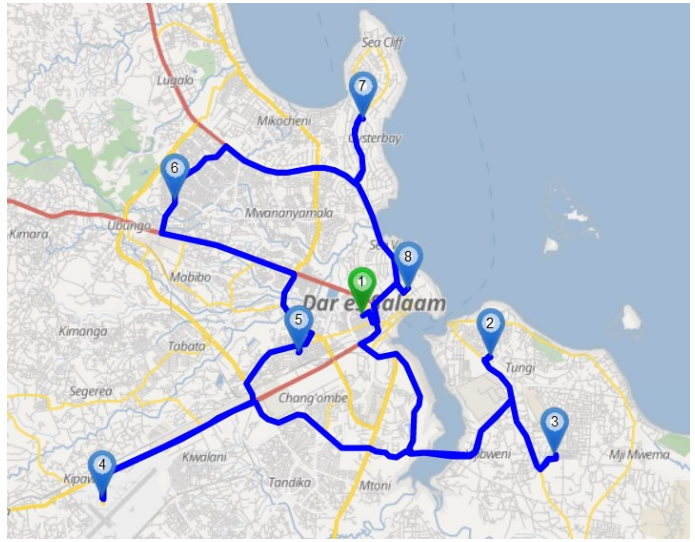


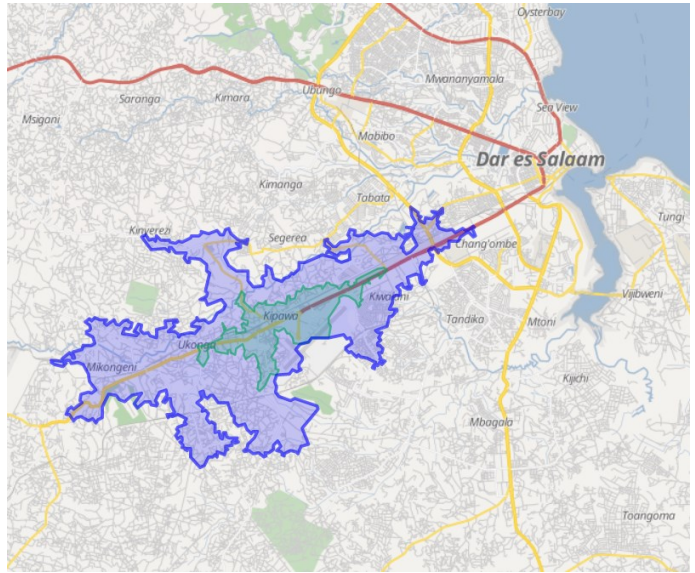
Technology choices



GraphHopper facts

- OS release 2014. Company founded in 2016.
- Written in Java. Apache 2 License
- Use as library, server or SaaS (Unix, Win, Mac)
- Offline routing via Android and iOS
- Routing:
  - Contraction Hierarchies, Dijkstra / A* / hybrid
  - Turn costs, alternative routes, instructions, height data
  - Profiles for car, truck, bus, moto, bike profiles
  - Other data sources possible (e.g. TomTom)
- More sub projects:
  - Isochrones, Map Matching, Geocoding, jsprit (TSP)
  - Matrix Optimization (closed)

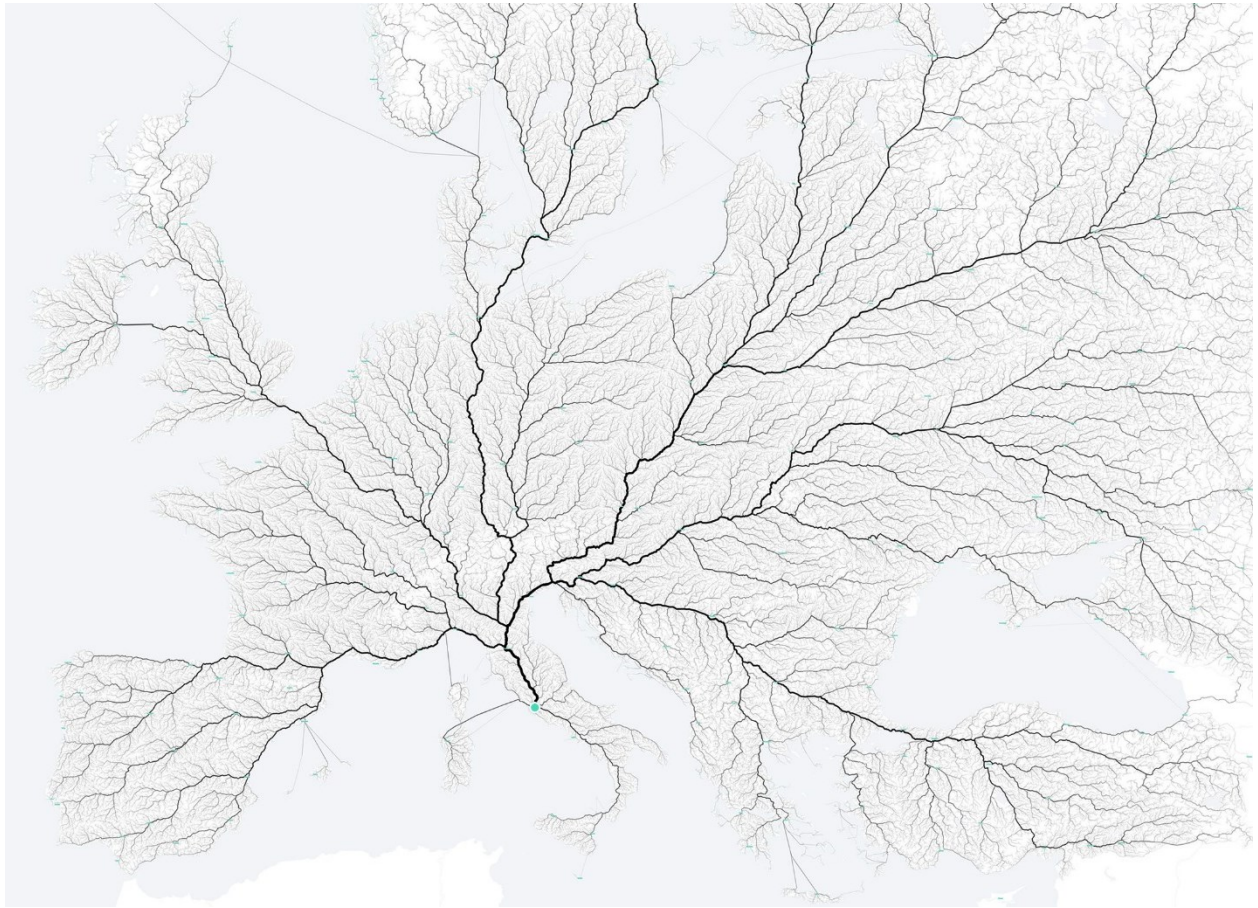




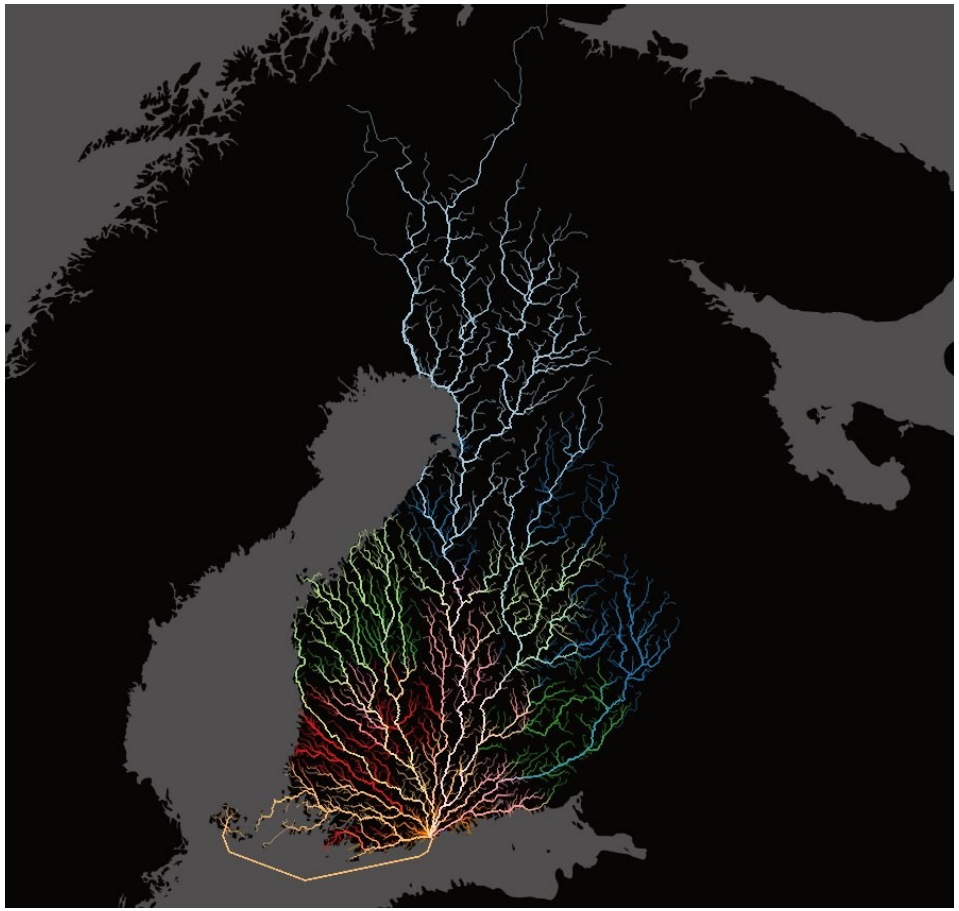
What we like about it

- Easy to setup on your own machine
- Very fast and reliable
- APIs are well documented (see https://graphhopper.com/api/1/examples/)
- Active discussion board: https://discuss.graphhopper.com/
- Company has a sane business plan: https://graphhopper.com/public/slides/2018-ppu.pdf
- OS Spirit: Gh teams attends FOSS conferences and OSM meetings

Graphhopper Showroom



http://roadstorome.moovellab.com/

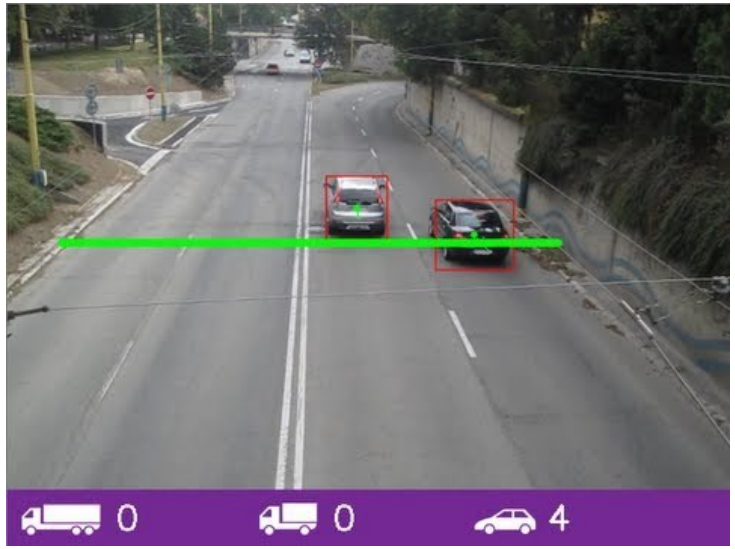


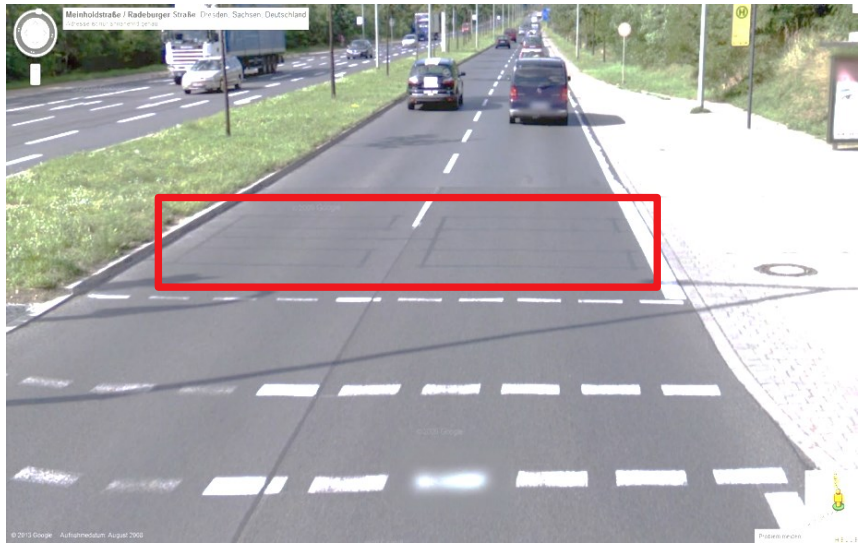
https://twitter.com/tjukanov/status/871329474125672448

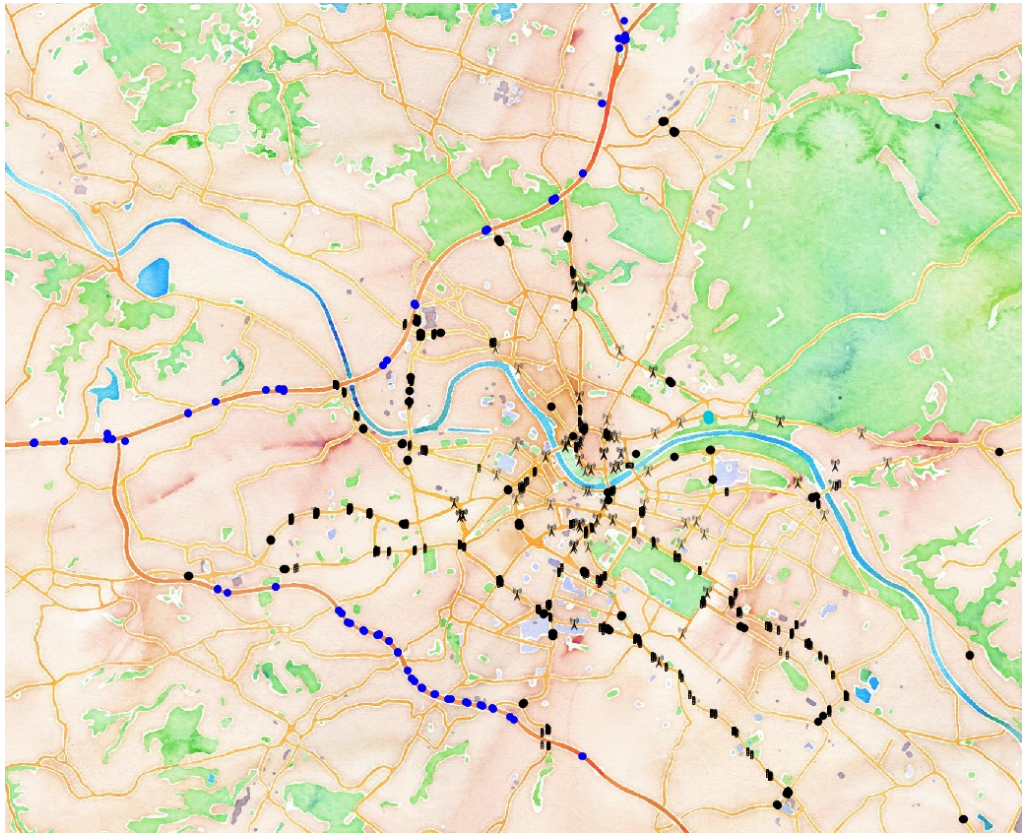
WHAT KIND OF DATA IS NEEDED TO CREATE A TRAFFIC MANAGEMENT SYSTEM?

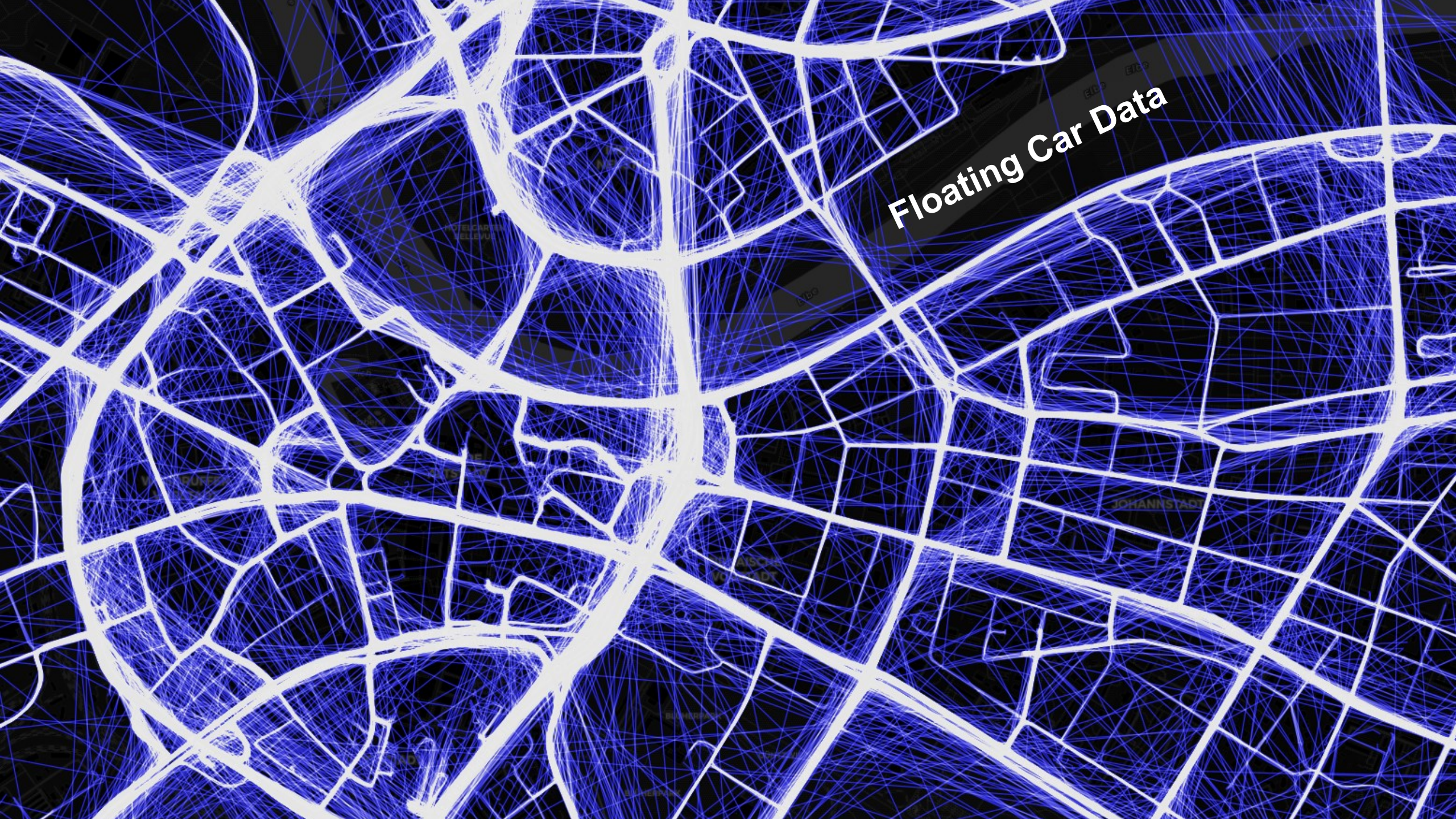
Sensor Data

https://youtu.be/z1Cvn3_4yGo



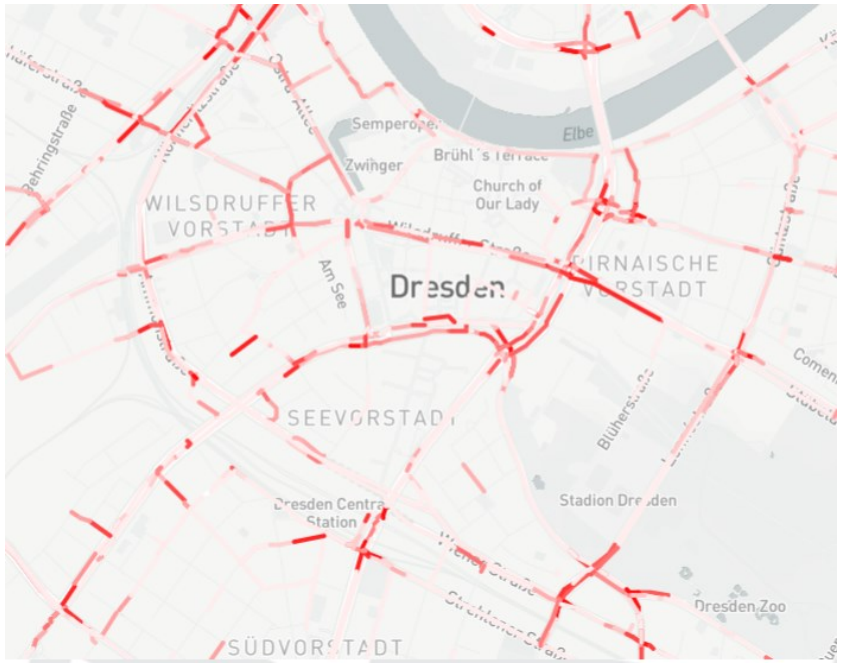





Floating Car Data

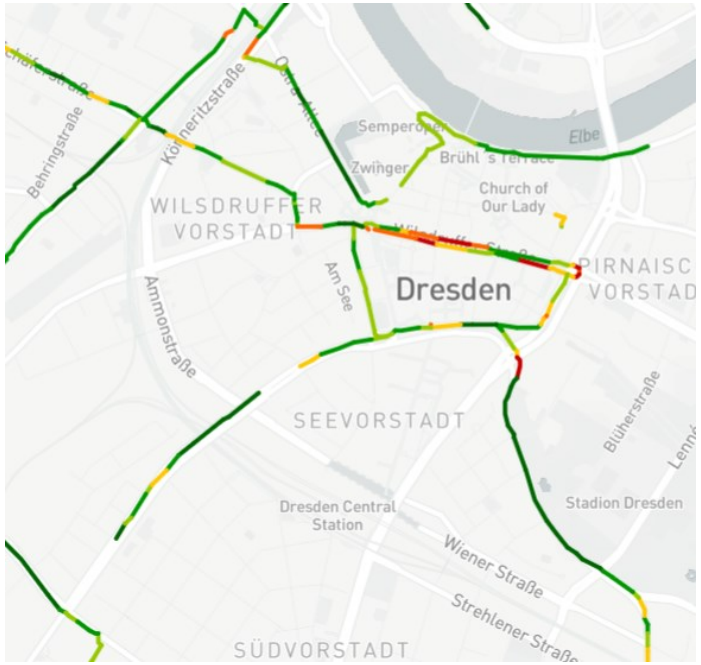
WMS / WMST / WFS

Travel Times (more red = higher)



Avg. speed (more blue = faster)

Level of Service (A-F)

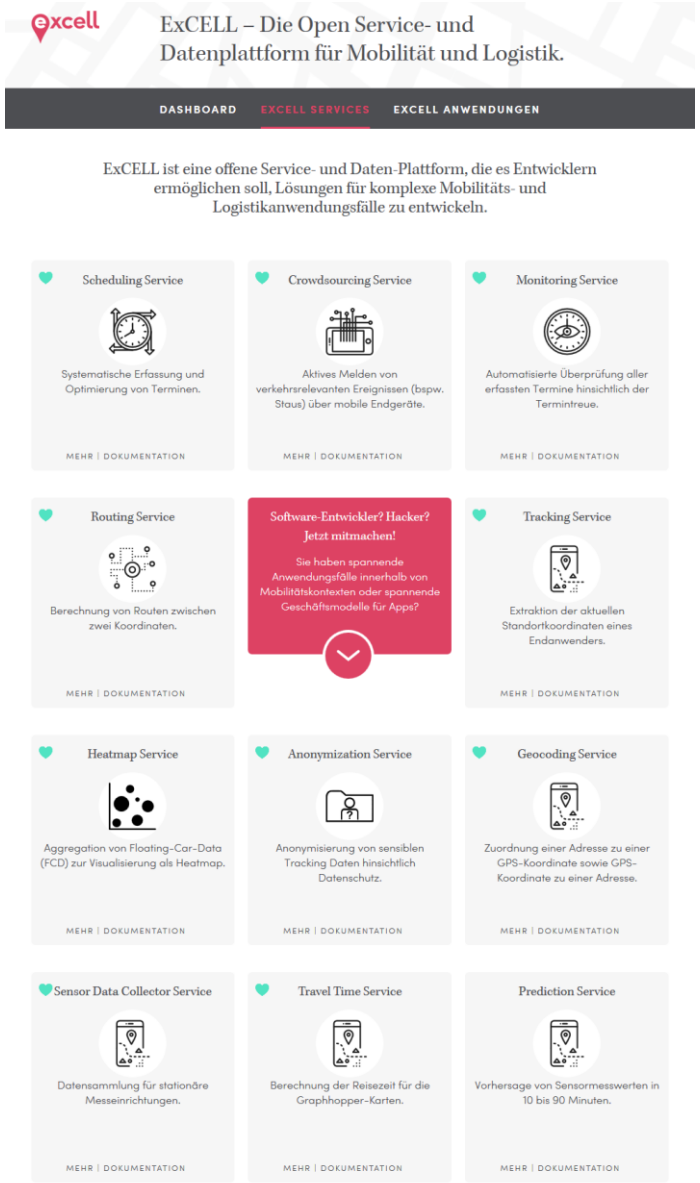


GeoServer

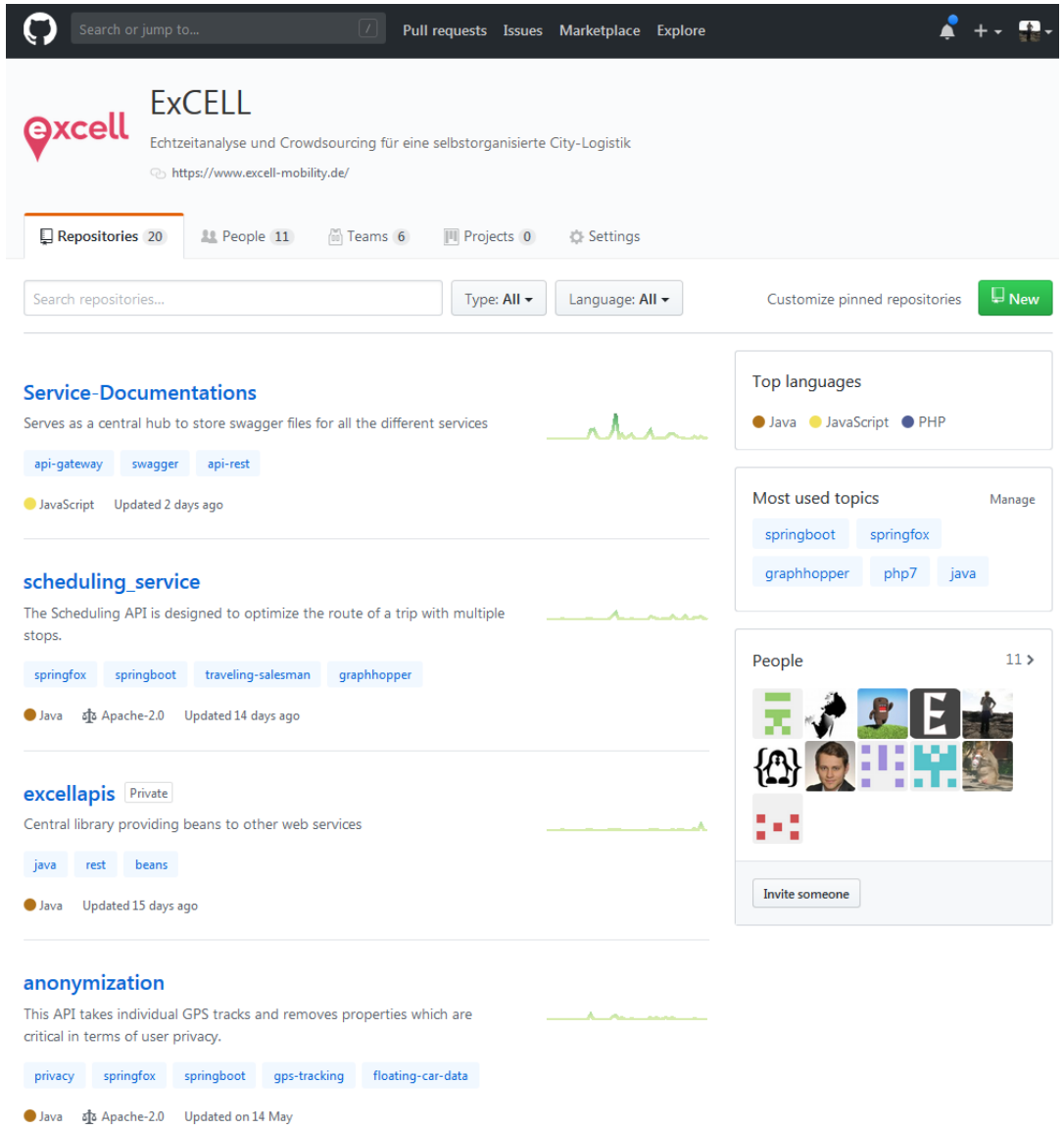
URL: excell-mobilty.de/developer

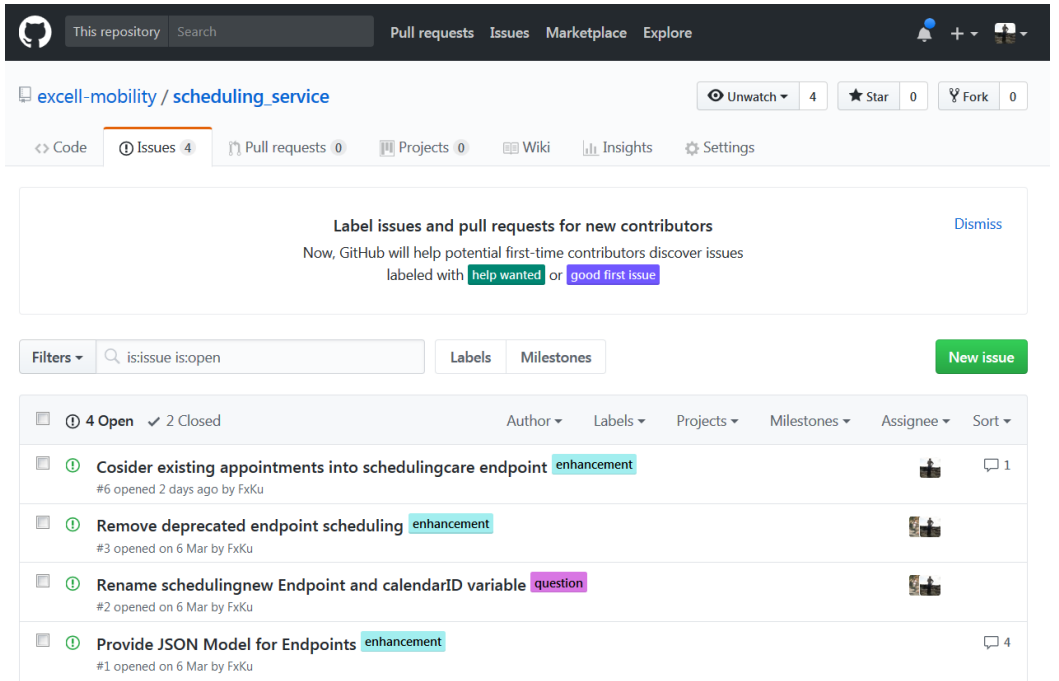
ExCELL Plattform

- 12 Web-Services with 46 Endpoints
- One central API Gateway
- 3 Client application
- > 20.000 Lines of Code
- Unique combination of free street data with real-time traffic data
- URL: excell-mobilty.de/developer



https://github.com/excell-mobility





ExCELL Outlook

- Hosting continues also after project end
- Integration of more data sources (MDM, MCloud)
- Create partnerships with more cities (Wolfsburg, Darmstadt etc.)
- Dynamic referencing of travel times in a changing graph (e.g. OpenLR)

Conclusion

- Traffic management requires more area-wide open telemetry data from public sector
- Crowdsourced tracking data by companies
- Don‘t feed the dictator: https://www.cbc.ca/news/technology/google-movements-tracking-1.4782895

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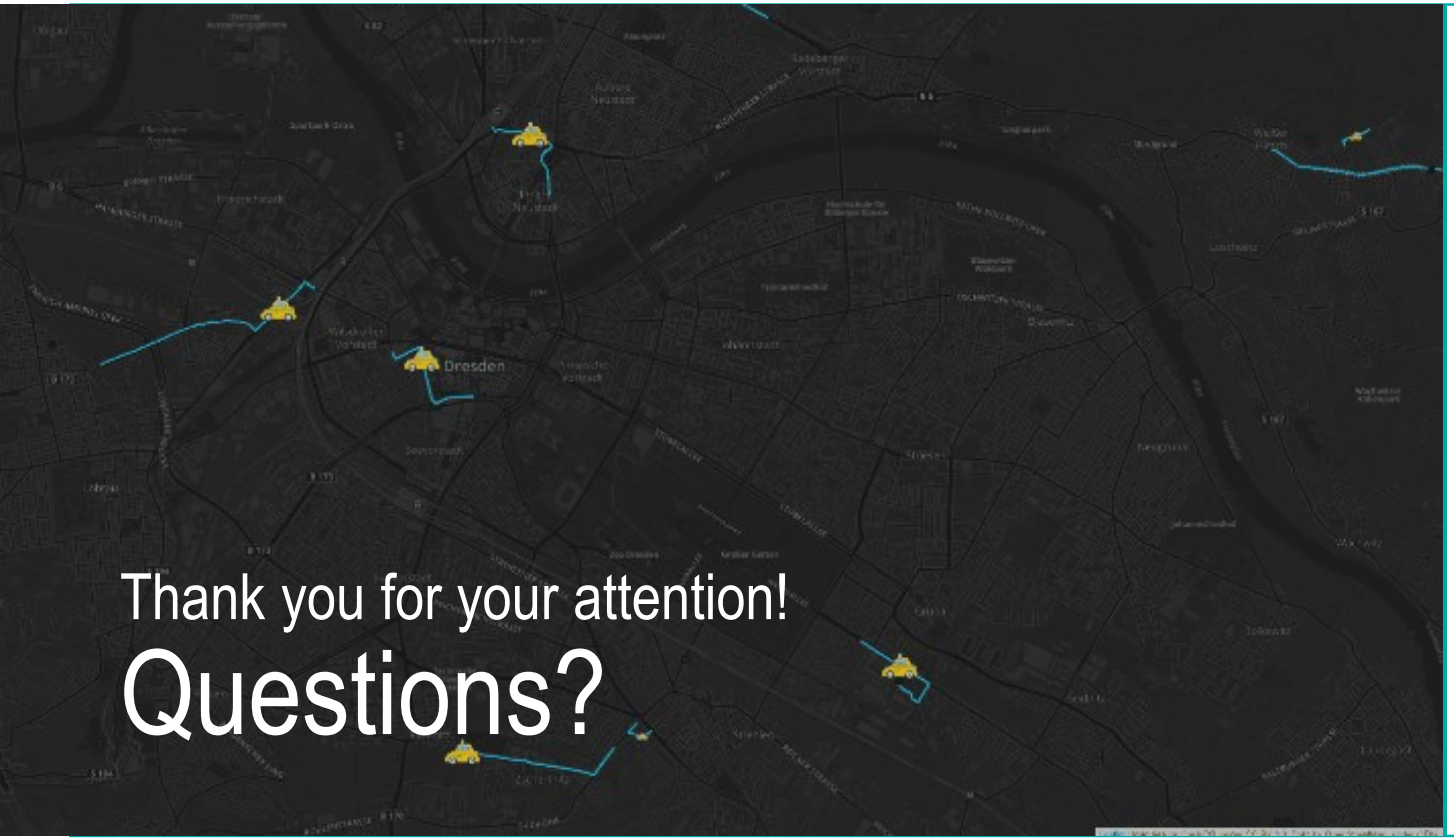

Thank you for your attention!

Questions?

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Supported by:

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