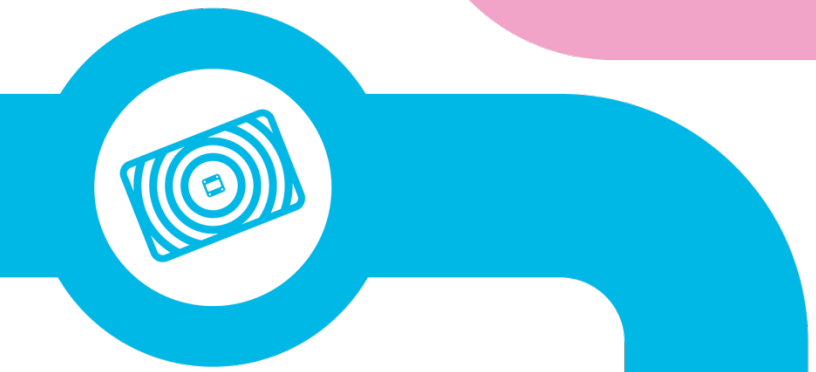
100% Open Journey Planning

Open source, open APIs, open data

Tuukka Hastrup 2016-01-31



Topics

REST

GraphQL

GTFS

MQTT

OpenStreetMap

Open standards

Open data

Open APIs

OpenTripPlanner

Digitransit

HTML5

React.js

Real-time routing

Pelias

CoffeeScript

Multimodal routing

FOSS

Leaflet

Developer community

UI and UX design

Agile development

HSL HRT

Public transport is important!

- More enjoyable cities, cheaper housing
- Youth in cities like Stockholm & Helsinki don't want to get a driver's license anymore

- Different customer profiles
  - Daily customers of public transport, commuting
  - Car owners → Mobility as a Service (MaaS)
  - Tourists

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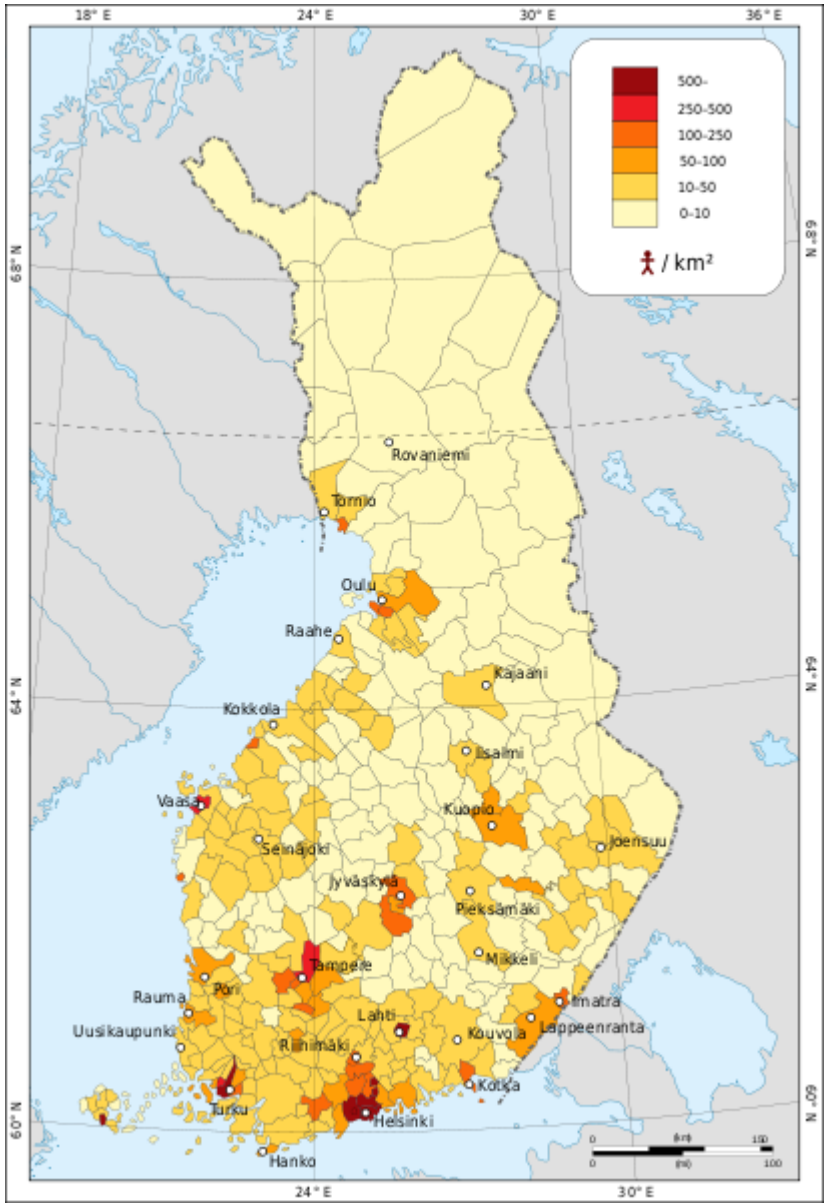
Case Helsinki and Finland

- Low population density
  → mass transportation is a challenge
- Helsinki region vs. national coverage

- Helsinki region public transport:
  - 1.3 million inhabitants
  - 1 million boardings per day

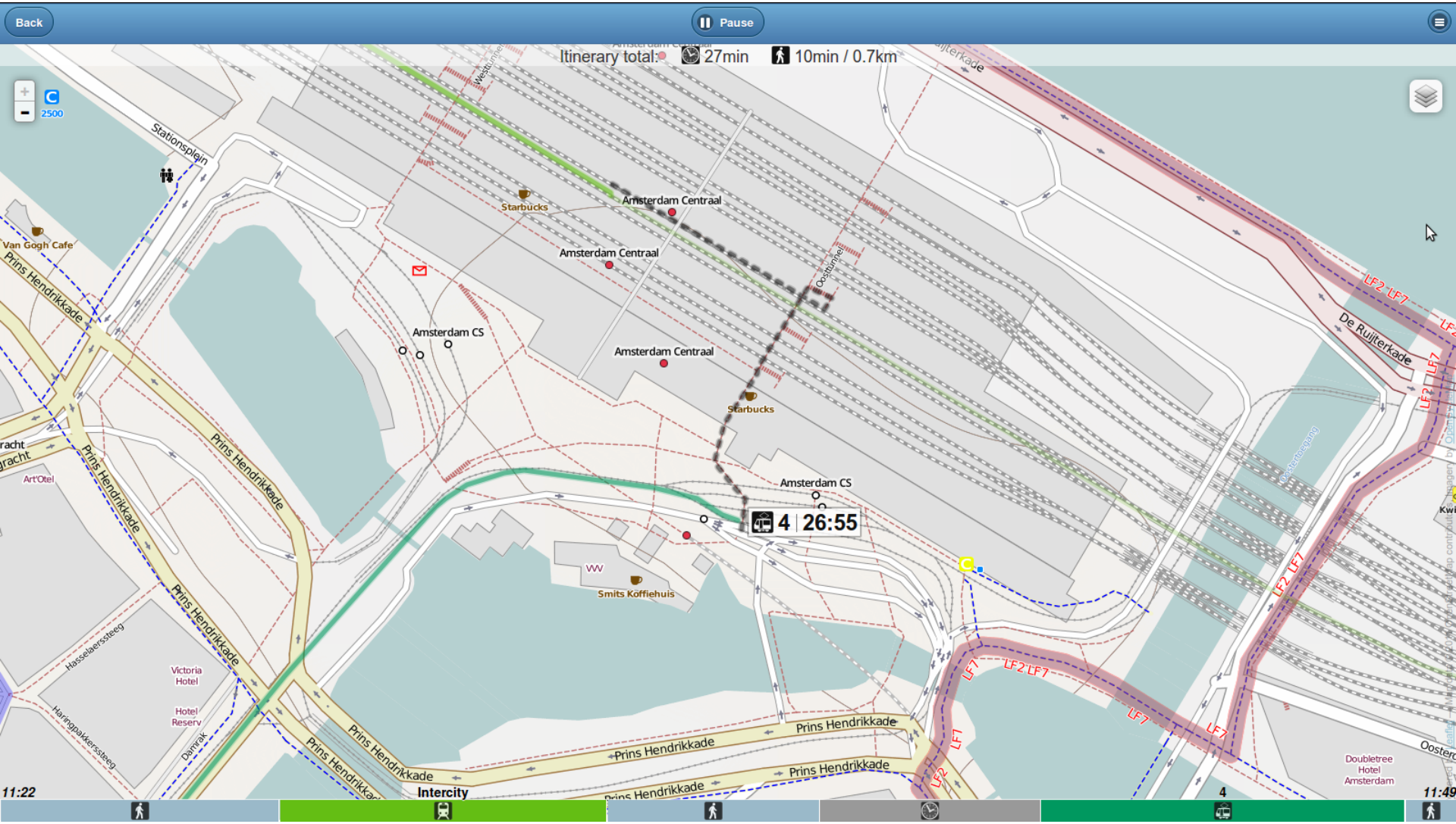
- Current HSL Journey Planner reittiopas.fi/en/
  - 0.1 million users per day
  - Customers very satisfied: 50% NPS



Digitransit: navigator for public transport

- Integrated real-time passenger services for multi-modal trips
- Open APIs first: This is not a single app, this is an application *and* a foundation for more: next generation, third parties, etc.
- Mobile first: Small screens set the design constraints
- HTML5 first: Can wrap HTML5 into native app later
- Regular customers first
  - A commuter shouldn't need to re-choose the destination every morning and evening.

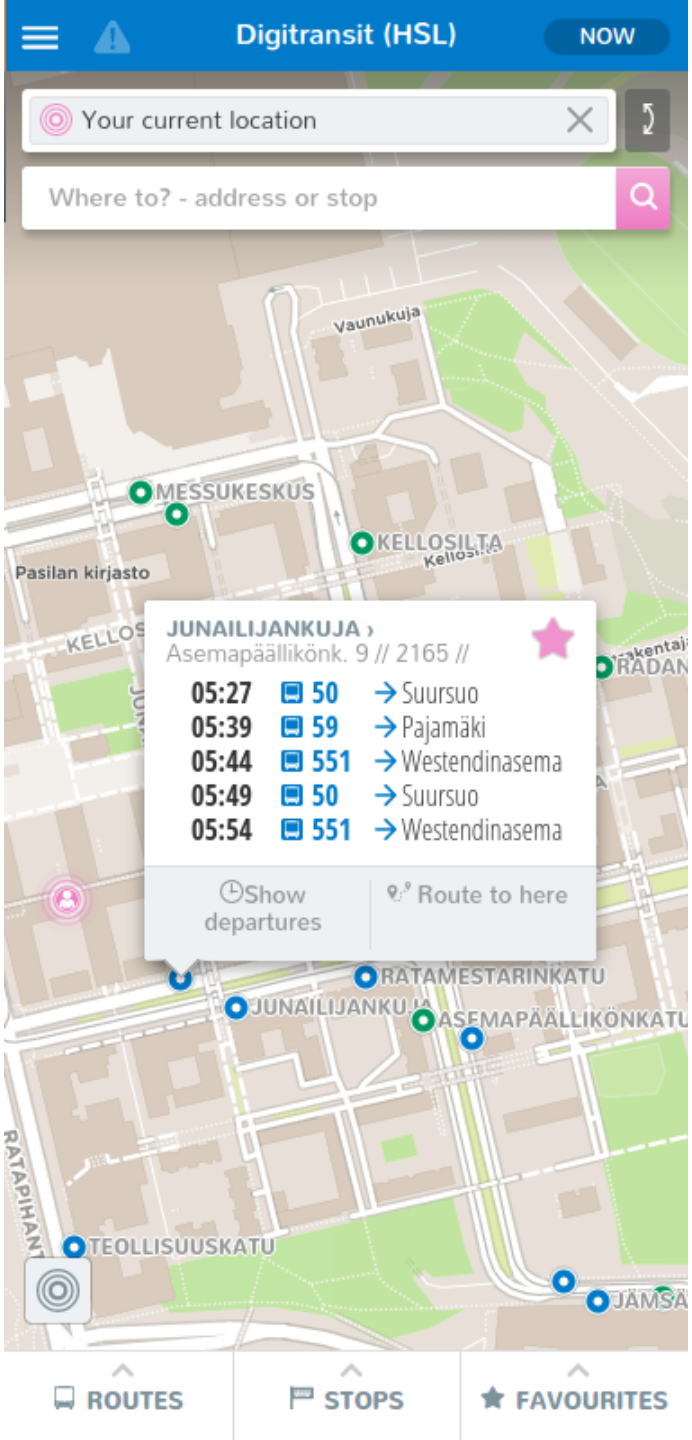
OpenStreetMap: Detailed street network

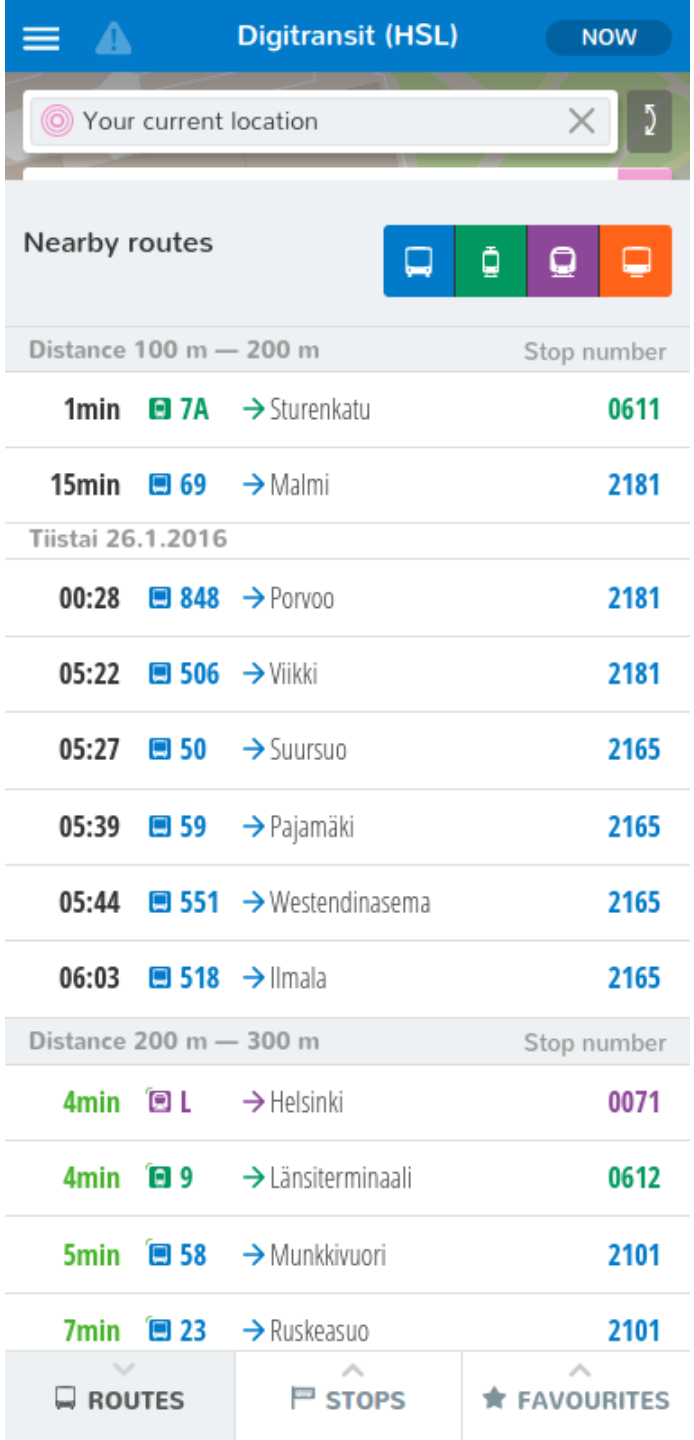


HTML5 mobile app

- Open Data, Open API,
  Open Source

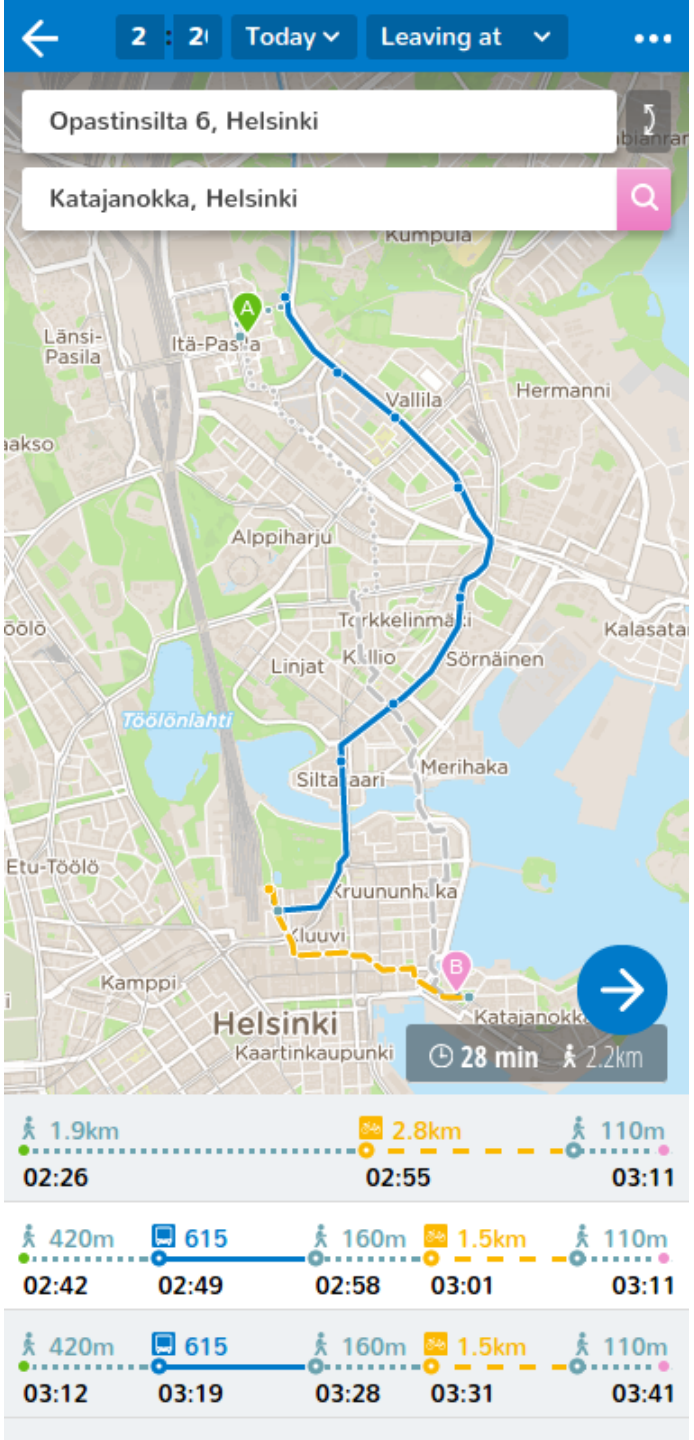
- Leaflet
- React, React-router, Fluxible
- Webpack, CoffeeScript





Nearest routes

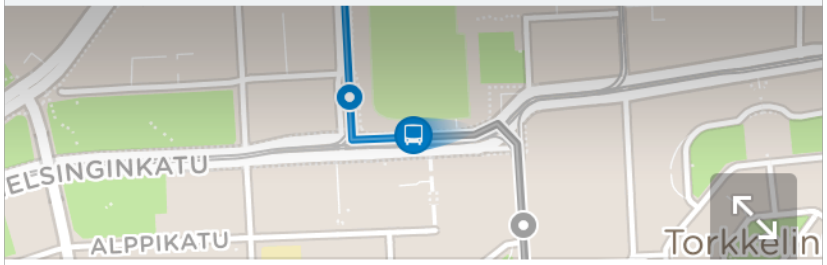
Citybike routing



Reittiopas

51 14:07 →

Hakaniemi - Malminkartano



Aika	Pysäkki	Pysäkkinumero
	Franzeninkatu Fleminginkatu 9	H2141
	Kaarlenkatu Kaarlenkatu 11	H0257
1 min	Urheilutalo Läntinen Brahenkatu	H2147
4 min	Brahenkatu Läntinen Brahenkatu	H0261
6 min	Elimäenkatu Sturenkatu 21	H2155
9 min	Hattulantie Mäkelänkatu	H2421
14:23	Mäkelänrinne Mäkelänkatu	H2425
14:24	Pyöräilystadion Mäkelänkatu	H2429

Reittiopas

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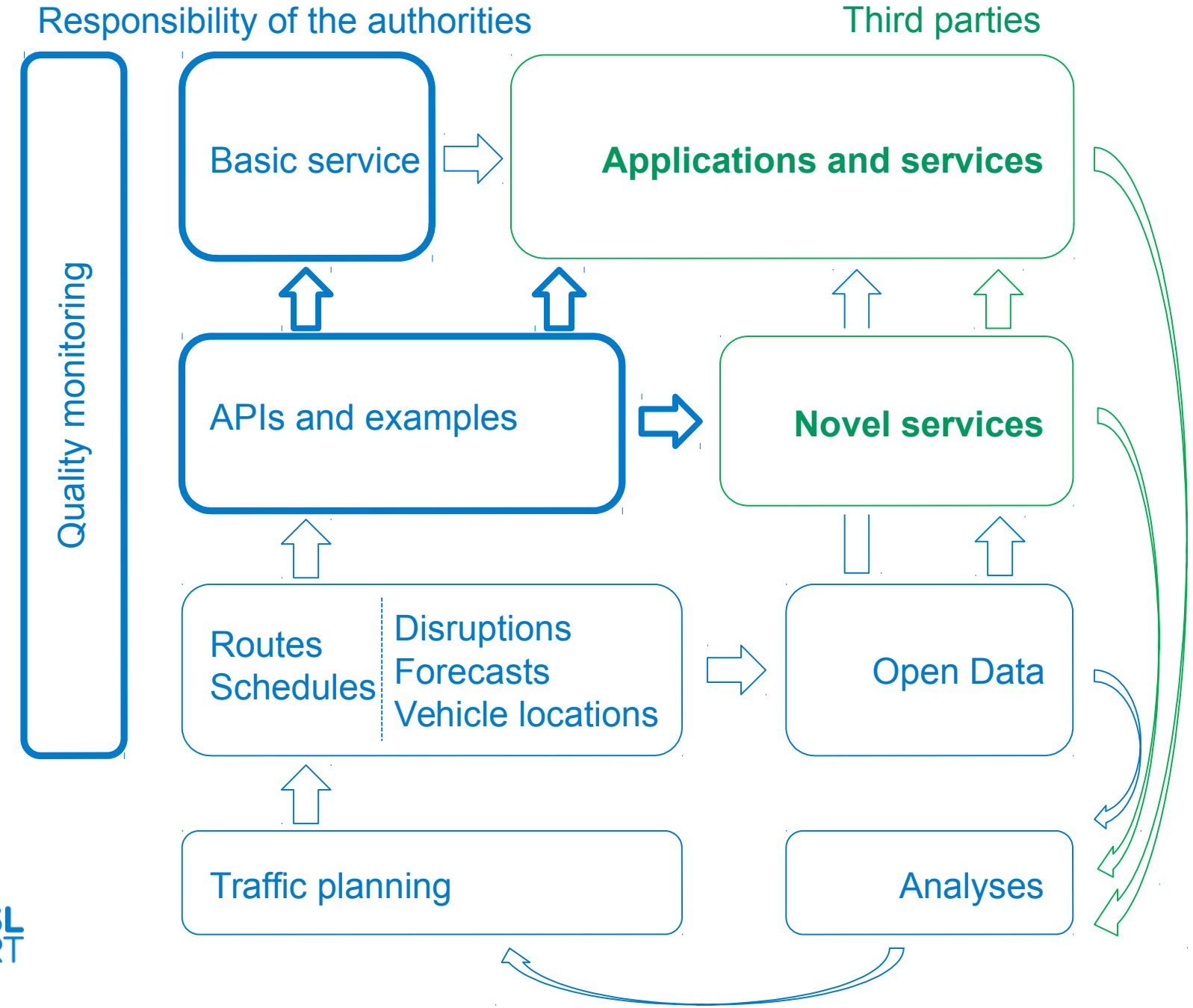
Transport data: production, APIs and utilisation



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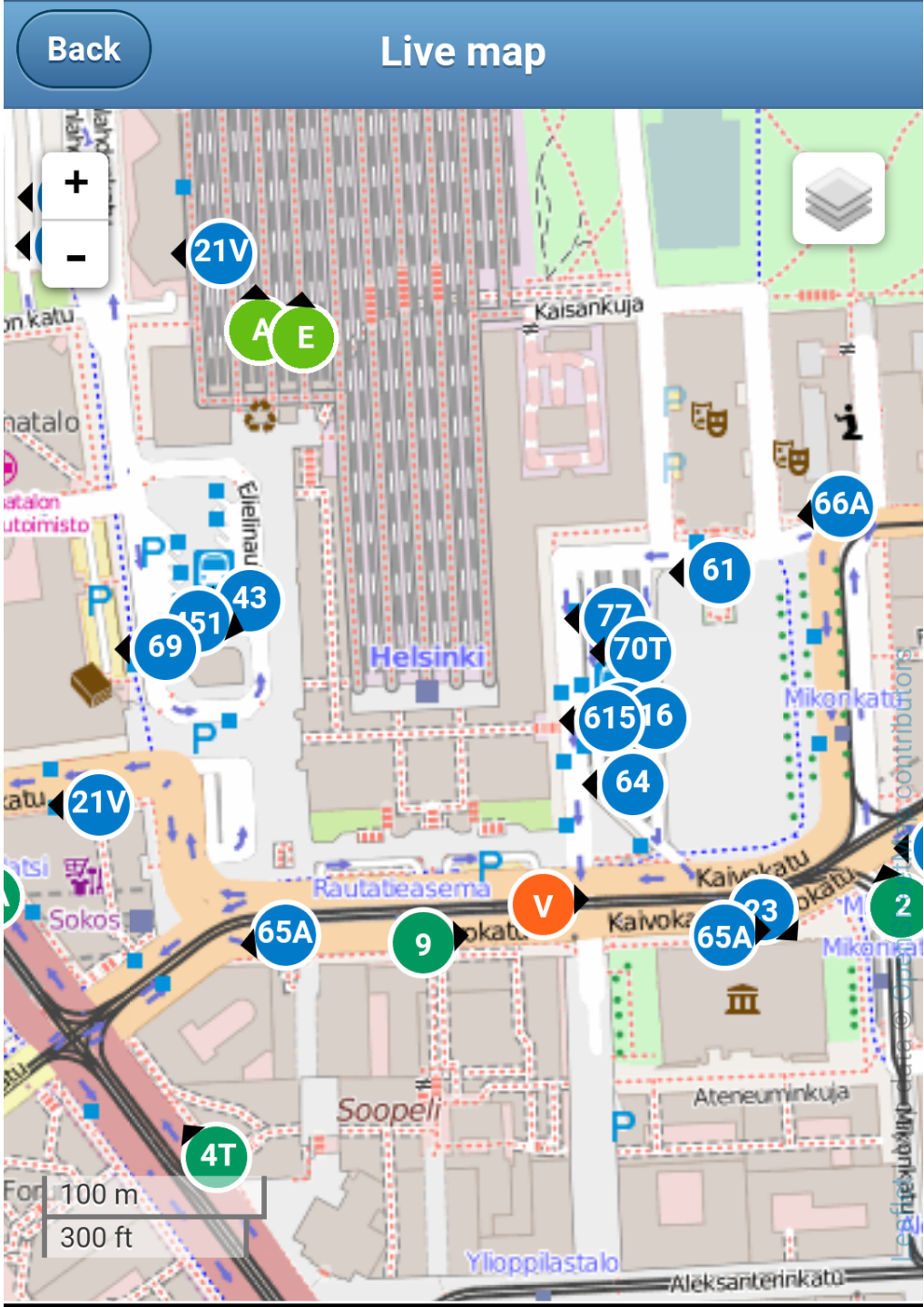
Vehicle locations



MQTT

Example message payload (JSON):

{"tsi":1431417982,"spd":5,"lat":60.17052,"long":24.94359,"dl":52 ..}

MQTT topic structure:

/hfp/journey/*type*/*id*/*line*/*direction*/*headsign*/*start_time*/
next_stop/*geohash_level*/*geohash*

Example message topic:

/hfp/journey/bus/67bf46c0/1055/1/Koskela/1105/
1020169/4/60;24/19/74/03

Example subscriptions:

/hfp/journey/# (all messages)

/hfp/journey/+/+/1055/1/# (line 1055 outbound)

/hfp/journey/+/+/+/+/+/+/+/60;24/19/# (geohash map rectangle)

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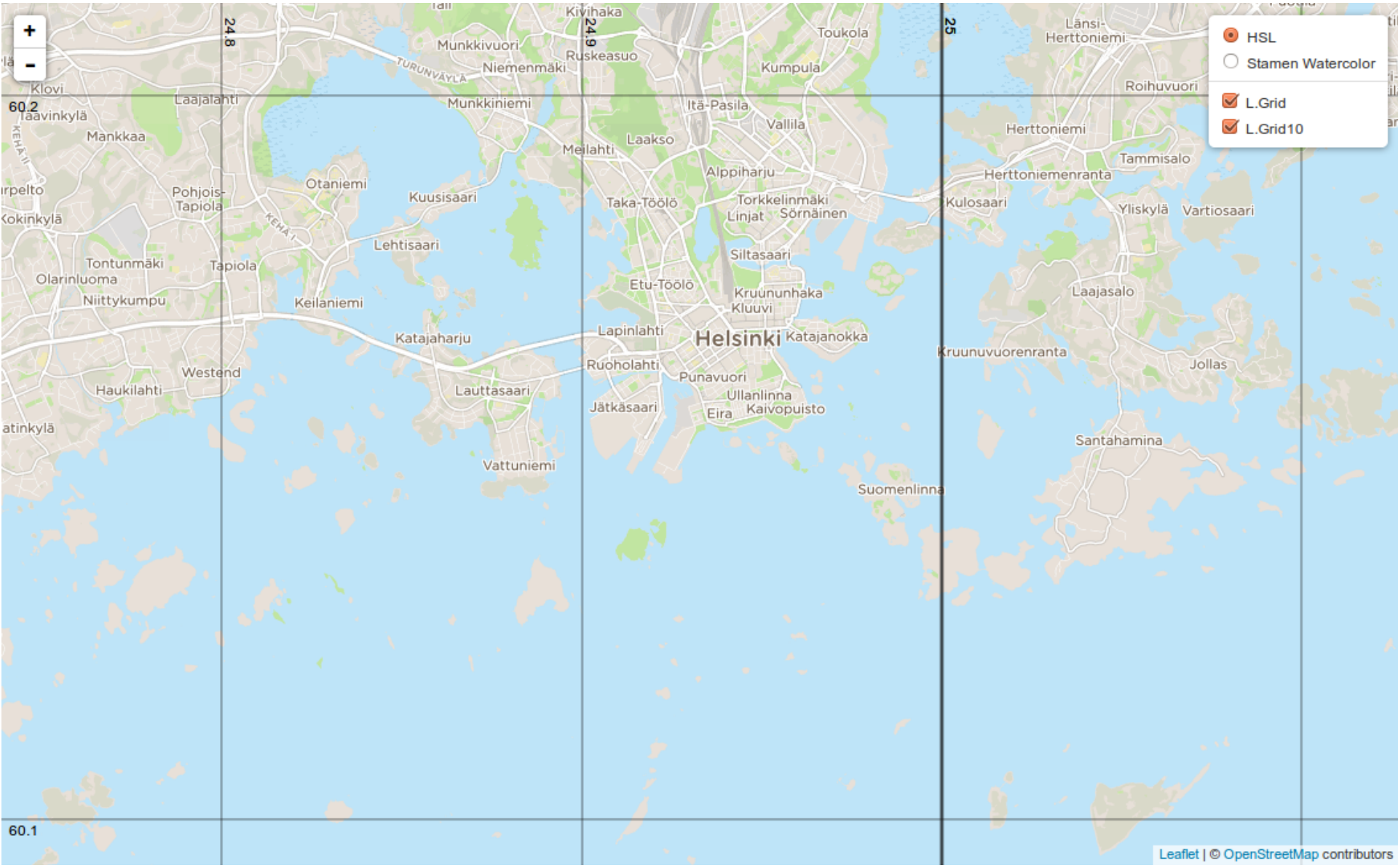
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Stamen Watercolor
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Helsinki
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Munkkivuori
Ruskeasuo
Niemenmäki
Toukola
Kumpula
Länsi-Herttoniemi
Roihuvuori
Herttoniemi
Tammisalo
Herttoniemenranta
Yliskylä
Vartiosaari
Kulosaari
Laajasalo
Kruununvuorenranta
Jollas
Santahamina
Suomenlinna
Katajanokka
Kruununhaka
Kluuvi
Etu-Töölö
Siltasaari
Lapinlahti
Ruoholahti
Punavuori
Ullanlinna
Kaivopuisto
Eira
Jätkäsaari
Lauttasaari
Vattuniemi
Munkkiniemi
Itä-Pasila
Vallila
Laakso
Meilahti
Alppiharju
Taka-Töölö
Torkkelinmäki
Linjat
Sörnäinen
Kuusisaari
Lehtisaari
Otaniemi
Pohjois-Tapiola
Tapiola
Tontunmäki
Olarinluoma
Niittykumpu
Keilaniemi
Katajaharju
Westend
Haukilahti
Laajalahti
Klovi
Mankkaa
Turunväylä
Kehä I
Kehä II
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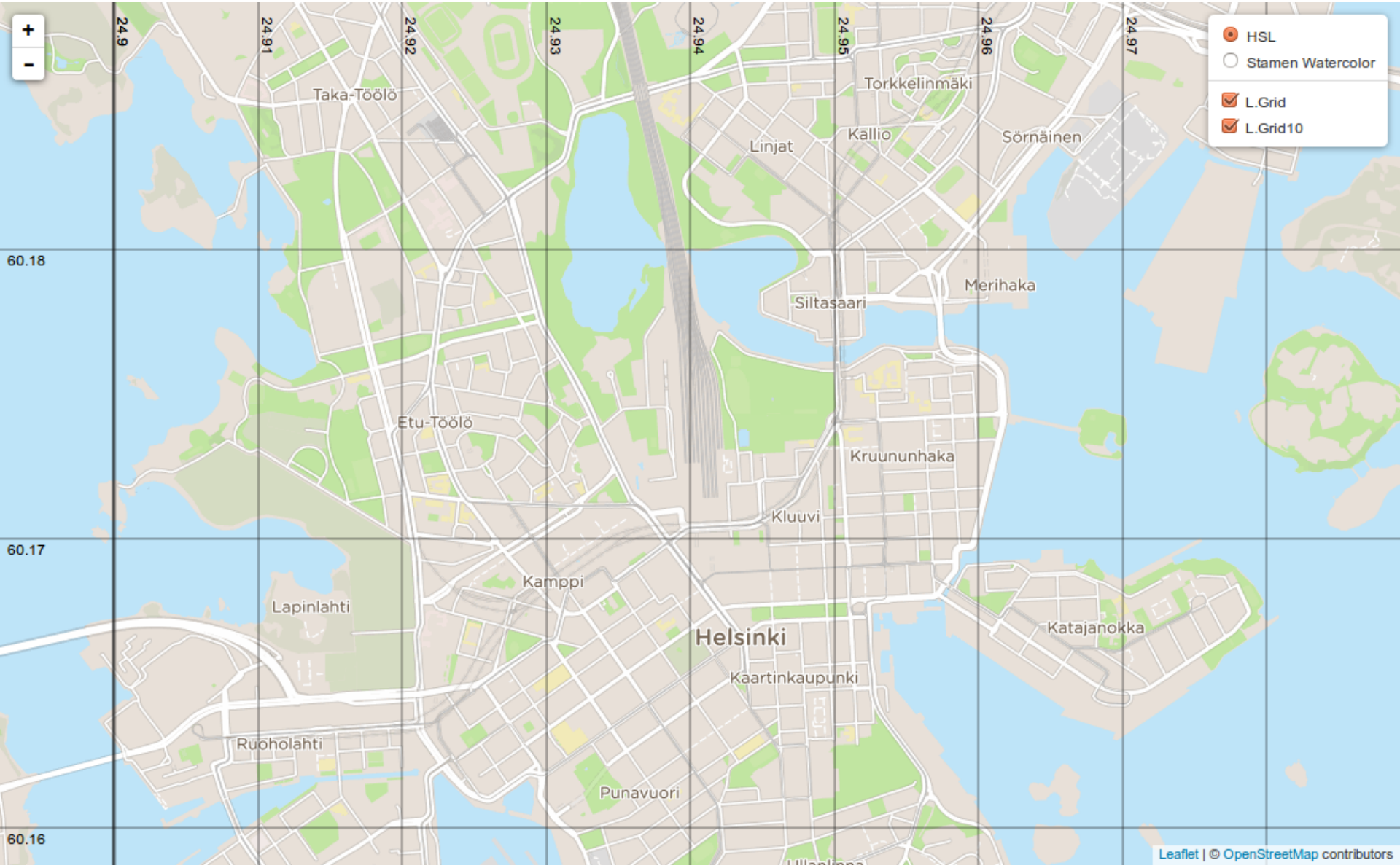
+
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Taka-Töölö
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Kallio
Linjat
Sörnäinen
Merihaka
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Kluuvi
Kamppi
Lapinlahti
Helsinki
Katajanokka
Kaartinkaupunki
Ruoholahti
Punavuori
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GraphQL (1/2)

```
{ stops { lat lon name } }
{ agency(id:"HSL") {
    routes {
        gtfsId type shortName longName
}}}
{ stopsByRadius(lat:60.218, lon:24.816, radius:500) {
    edges { node {
        distance
        stop { gtfsId }
}}}}
```

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GraphQL (2/2)

```
{
  stop(id:"HSL:2111230") {
    name
    stoptimesWithoutPatterns(numberOfDepartures:20) {
      scheduledDeparture
      departureDelay
      trip {
        tripHeadsign
        route { type shortName }
}}}}
```

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Main code repositories

- digitransit: documentation
- digitransit-ui: application
- digitransit-deploy: Ansible, Docker, Compose
- navigator-server: publish-subscribe for realtime data

http://github.com/HSLdevcom

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Digitransit project resources

Government funding: HSL and FTA

Development team:

- 7 consultants (6 developers, 1 graphical designer)
- 1 in-house developer, Finnish Transport Agency
- 1 in-house senior developer / architect, HSL

Schedule:

- Beta version this spring
- Production before end of this year

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Conclusions

- If your city has GTFS open data, you should deploy this
- If not, you should ask the goverment to open the data
- For better public transport, contribute to Digitransit

Making it easier to hack public services.

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Thank you!

Project site:
`digitransit.fi/en`
Belgium demo:
`dev.hsl.fi/belgium`

@tuukkah Tuukka.Hastrup@hsl.fi

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